FINAL REPORT

THE

National Army Training Detachments

Later Known as

Vocational Section S. A. T. C.

County ....
Hole ....

By

C. R. DOOLEY

Educational Director Vocational Instruction

WAR DEPARTMENT
COMMITTEE ON EDUCATION AND SPECIAL TRAINING
WASHINGTON
MARCH, 1919

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March 29, 1919.

Dr. C. R. Mann, Chairman Advisory Board,
Committee on Education and Special Training,
Room 210, Mills Building, Washington, D. C.

My dear Doctor Mann:

I take pleasure in handing you herewith a brief report of the Vocational Training work carried on by the Committee.

The splendid spirit of helpfulness and cooperation manifested by the schools throughout the country deserves special mention. This spirit was a most important factor in whatever degree of success may be ascribed to this work. In this statement, I mean to include hundreds of persons connected with these schools, many of them in minor capacities, and citizens of the school communities who universally gave so abundantly of their time, energy and thought.

Within our own immediate organization the men and women forgot their individual interests and gave themselves continuously and without reserve, to team work, the like of which I have never seen. Of these, the men who represented the Committee in the Field day by day bore the brunt of meeting new technical and social situations.

Our policies of decentralized supervision, of setting forth definitely the kind of soldier the Army desired, of teaching by doing, yet of helping the schools develop details of methods through their own experiences to suit local conditions, proved most wise.

This report has been prepared largely by a committee composed of Norman Collyer, Assistant Director; E. R. Newby, Field Director; J. A. Randall, Associate Editor, and S. A. Zweibel, District Director. The general digest, selection and arrangement of the material was made by Mr. Zweibel.

C. R. DOOLEY,
Educational Director,
Vocational Instruction.

FOREWORD

During the six months beginning April 1, 1918, the Committee on Education and Special Training trained and delivered to the Army over 100,000 men. An additional 40,000 men were about ready for delivery when the armistice was declared. These not only constituted a body of specially trained soldiers, but they represented just so many mobilized troops over and above total cantonment capacity because they were obtained directly from the draft boards. Approximately 70,000 of these men were sent overseas before the armistice was signed. Altogether the Committee operated in one hundred fifty-seven different schools and carried on training in sixty-seven different trades.

At the time of the signing of the armistice, contract relations were complete for the training of 220,000 additional men up to July 1, 1919.

Reports received after demobilization from schools, from educational directors and from military inspectors containing educational data as to previous education, previous experience, methods of instruction under various conditions, types of instructors, equipment, costs, progress of students, relationship of military and vocational features to each other, etc., present such a vast amount of material that months of careful study would be required to present a thoroughly digested report. Practically all of the vocational staff were released from duty by January 1, 1919, and therefore this report presents the hasty collection of the most important features with but little attempt at careful analytical study. It is to be regretted that funds were not available to continue at least a few members of the staff a sufficient length of time to present all of the details of this educational experiment to the schools of the land. It is believed that such a continued study and cooperation with the schools would have contributed greatly to the development of the human resources of our country.

PREFACE

This report is a summary of the important features of the work accomplished in the National Army Training Detachments* beginning April 1, 1918.

Information in greater detail on the work of the Vocational Section is contained in the reports of the following division heads:

1. District Educational Directors.
2. Field Director.
3. Supervisor, Motor Transport Training.
4. Supervisor, Communications Training.
5. Supervisor, Band Musician Training.
7. Editor-in-Chief—Instruction Manuals.
6. Supervisor, Negro Training.
8. Inspecting Committee of Corps of Representatives.
9. Reports from Individual Schools.

Copies of the foregoing reports are on file with:

The Committee on Education and Special Training, War Department.
Historical Committee of the General Staff.
Bureau of Education, Washington.
Congressional Library, Washington.
Engineering Societies Library, 29 W 39th St., New York City.
Dr. C. R. Mann, New York City.
Mr. C. R. Dooley, East Pittsburgh, Pa.

This report is Part II of the complete report of the Committee on Education and Special Training which is organized as follows:

Part I.	General Report of Committee.
Part II.	Vocational Section (National Army Training Detachments).
Part III.	Collegiate Section.
Part IV.	War Issues Course.

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*After October 1, 1918, known as Vocational Section or Section B of the Students' Army Training Corps.

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PART I

GENERAL OPERATING PLAN

CREATION OF COMMITTEE ON EDUCATION AND SPECIAL TRAINING

The declaration of war by the United States placed before the War Department the task of raising our regular standing peace-time army of 45,000 men to a national army of several millions. In the beginning, men were obtained by voluntary enlistments. On May 18, 1917, the Selective Service Act was passed by Congress. This law authorized the President to build up a large army by a selective process designed to interfere as little as possible with the man-power of agriculture and industry, also necessary to the successful prosecution of the war.

An organized army consists of more than a mere aggregation of men. Occupational specialists in a large number of trades are absolutely necessary. Of every 100.000 men required by the staff corps, 82,000 must be specialists; of every 100,000 men used by the Infantry 40,000 must be specialists. Every combat division composed of 36,000 men contains:

691	Chauffeurs (auto and truck)
360	Telephone repairmen
167	Mechanics
163	Telegraphers
156	Radio operators
151	Carpenters
142	Linemen
128	Tractor operators
128	Machinists
122	Truck masters
78	Auto mechanics
67	Blacksmiths
64	Mechanical draftsmen
63	Electricians
52	Leather and canvas workers
29	Switchboard operators

and a lesser number from 68 additional trades. A still larger proportion of specialists are needed in the strictly mechanical units of Ordnance, Engineers, Military Aeronautics, Signal and Motor Transport Corps.

The operation of the Selective Service Act soon disclosed the fact that an insufficient number of trade specialists were being furnished by the draft. Machinists, blacksmiths, electricians, and similar skilled workmen were obtainable, but were also needed in the very important work of manufacturing munitions; the industrial tendency of the country had been to reduce the number of horseshoers, harness makers, wheelwrights, etc., while another group, among which were airplane mechanics, battery mechanics, was almost non-existent. The age limits imposed by the Act increased the difficulty of the situation, for among the men received at the various camps through the draft, few had served a sufficient length of time at their trades to have developed the speed, accuracy and resourcefulness needed in the Army. Trade tests given to these men by the Committee on Classification of Personnel in the Army showed that only 6 per cent could be classed as experts, 28 per cent as journeymen, and 40 per cent as apprentices, the remaining 26 per cent having had only a very limited trade experience.

The Committee on Classification of Personnel performed excellent work in getting each place filled by the right man, but the limited number of specialists that came through the draft enabled them to supply only 44 per cent of the requirements of the Field Artillery, 42 per cent of the Coast Artillery, 64 per cent of the Signal Corps, 45 per cent of the Engineers' Corps, and 41 per cent of the Construction Corps during the whole period of mobilization.

Thus the limited supply of skilled workmen among the enlisted men made necessary the establishment of training schools to supply the kinds and numbers of soldiers needed by the various corps to complete their organizations. Such schools were started by the corps themselves at a number of camps and cantonments. At the same time industrial and trade schools, colleges and universities were being depleted of their students by enlistment in the Army and Navy, thus making buildings, equipment and teaching staffs, with some readjustment, available for the kind of instruction required by the Army. The possibility of an outside educational agency functioning in this manner was considered, and a number of contracts were directly made by different corps with the colleges, covering either the use of facilities or teaching staffs, or both.

It soon became evident, however, that independent training systems operated by the several corps would add confusion and not achieve the end sought. A systematic and well coordinated method of serving all branches of the service was essential.

The result was the issuance by the General Staff of General Orders number 15 creating the Committee on Education and Special Training:

GENERAL ORDERS
No. 15
I. * * * * * *

War Department,
Washington, February 10, 1918.

II. 1. There is hereby created within the War Department "The Committee on Education and Special Training." This committee of three members shall consist of the following:

Colonel Hugh S. Johnson,
Deputy Provost Marshal General.

Lieutenant Colonel Robert I. Rees,
General Staff.

Major Grenville Clark,
Adjutant General's Department.

2. Under the direction of the Chief of Staff the functions of the committee shall be: To study the needs of the various branches of the service for skilled men and technicians; to determine how such needs shall be met, whether by selective draft, special training in educational institutions or otherwise; to secure the cooperation of the educational institutions of the country and to represent the War Department in its relations with such institutions; to administer such plan of special training in colleges and schools as may be adopted.

3. The Committee on Education and Special Training shall have associated with it an advisory civilian board appointed by the Secretary of War, composed of representatives of educational institutions. An officer shall be detailed by the Chief of each staff corps and department to consult with the committee concerning the needs of his corps or department.

4. The committee will be given such assistance, commissioned and civilian, as may be necessary to fully execute its duties, with office room in the War Department Building.

(334.8 A. G. O.)

By order of the Secretary of War:

JOHN BIDDLE,
Major General, Acting Chief of Staff.

Official:
H. P. McCain,
The Adjutant General.

The following were appointed members of the advisory board:

Dr. C. R. Mann, Chairman,
Carnegie Foundation, New York City.

Mr. J. W. Dietz, Secretary,
Educational Director, Western Electric Co., Chicago, Ill.

Dr. J. R. Angell,
Dean of the Faculties, University of Chicago.

Dr. S. P. Capen,
Specialist in Higher Education, Bureau of Education, Washington.

Mr. J. P. Monroe,
Federal Board for Vocational Education, Washington.

Late in March, 1918, Mr. Monroe resigned, and Herman Schneider, Dean of Engineering Department, University of Cincinnati, was appointed to fill the vacancy. Mr. Hugh Frayne, Chairman Labor Division, War Industries Board, Washington, and Dr. R. A. Pearson, President of Iowa State College, were added to the Board in May, 1918.

J. A. RANDALL
NORMAN COLLYER
S. A. ZWEIBEL
G. P. PHENIX
C. A. VERSCHOOR
J. E. ADDICOTT
W. GOODRICH
R. W. LEFAVOUR
W. H. PERRY
C. L. WHITE
W. B. RUSSELL
CAPT. R. A. LEAVELL
R. W. SELVIDGE
E. M. RANCK
T. M. CORCORAN
H. V. BOZELL
E. R. NEWBY
C. M. JANSKY
J. C. CHASE
H. C. GIVENS
C. R. DOOLEY
T. M. SPELMAN
P. B. WOODWORTH
W. H. TIMBIE
G. W. HOKE
W. H. DIECKMAN
LACY CROLIUS
H. D. BURGHARDT
R. A. JONES
F. H. SHEPHERD
A. L. WILLISTON
F. H. EVANS
P. H. SMILEY
C. H. DUNLAP
F. W. BOLAND
A. A. POTTER
F. E. MATHEWSON
H. J. HELFRICH
W. K. HATT
W. R. WORK
L. N. GEBHARD
W. S. FIELD
S. L. CONNOR
F. A. CLARK
L. A. ROY
W. T. B. WILLIAMS

Executive Personnel

DISTRICT ORGANIZATION

Before the Committee had fully organized its operating staff, negotiations were opened through the Federal Board for Vocational Education with a few institutions, to give vocational training to enlisted men. During the month of March the committee engaged P. H. Smiley, K. V. Carman and Adolph Shane to close contracts with a few institutions. They returned to Washington early in April, having made contracts which provided for the training of several thousand men in about twelve schools, to begin April 15th.

Under date of March 23, 1918, the Committee appointed Mr. C. R. Dooley, Manager of the Educational Department Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., to take the position of Educational Director, as indicated in the following telegram:

> "The Secretary of War directs me to ask you . . . to become Director of the Vocational Education project for Army needs now being developed by the War Department, Committee on Education and Special Training. . . . This project is of great importance both from point of view of protection of industry and from point of view of efficiency in the Army.
>
> H. P. McCain, The Adjutant General."

On April 1, the Educational Director assumed his duties in Washington. After conference with the Committee and the Advisory Board he appointed, under date of April 4, the following ten men to serve as District Educational Directors:

A. L. Williston Principal Wentworth Institute, Boston, Mass.	District No. 1.
F. E. Mathewson Director Vocational Training, Dickinson High School, Jersey City, N. J.	District No. 2.
S. A. Zweibel Director Industrial Education, Bethlehem City Schools, Bethlehem, Pa.	District No. 3.
*J. A. Pratt Director Williamson Trade School, Williamson School, Pa.	District No. 4
R. W. Selvidge Professor Industrial Education, Peabody College, Nashville, Tenn.	District No. 5
P. B. Woodworth Dean Lewis Institute, Chicago, Ill.	District No. 6
A. A. Potter Dean College Engineering, State Agricultural College, Manhattan, Kans.	District No. 7.
H. C. Givens Director Industrial Education, State Training Normal, Pittsburg, Kans.	District No. 8.
F. H. Shepherd Professor Industrial Education, State Agricultural College, Corvallis, Ore.	District No. 9.
J. E. Addicott Principal Polytechnic High School, San Francisco, Cal.	District No. 10.
†W. B. Russell Director Franklin Union, Boston, Mass.	District No. 6

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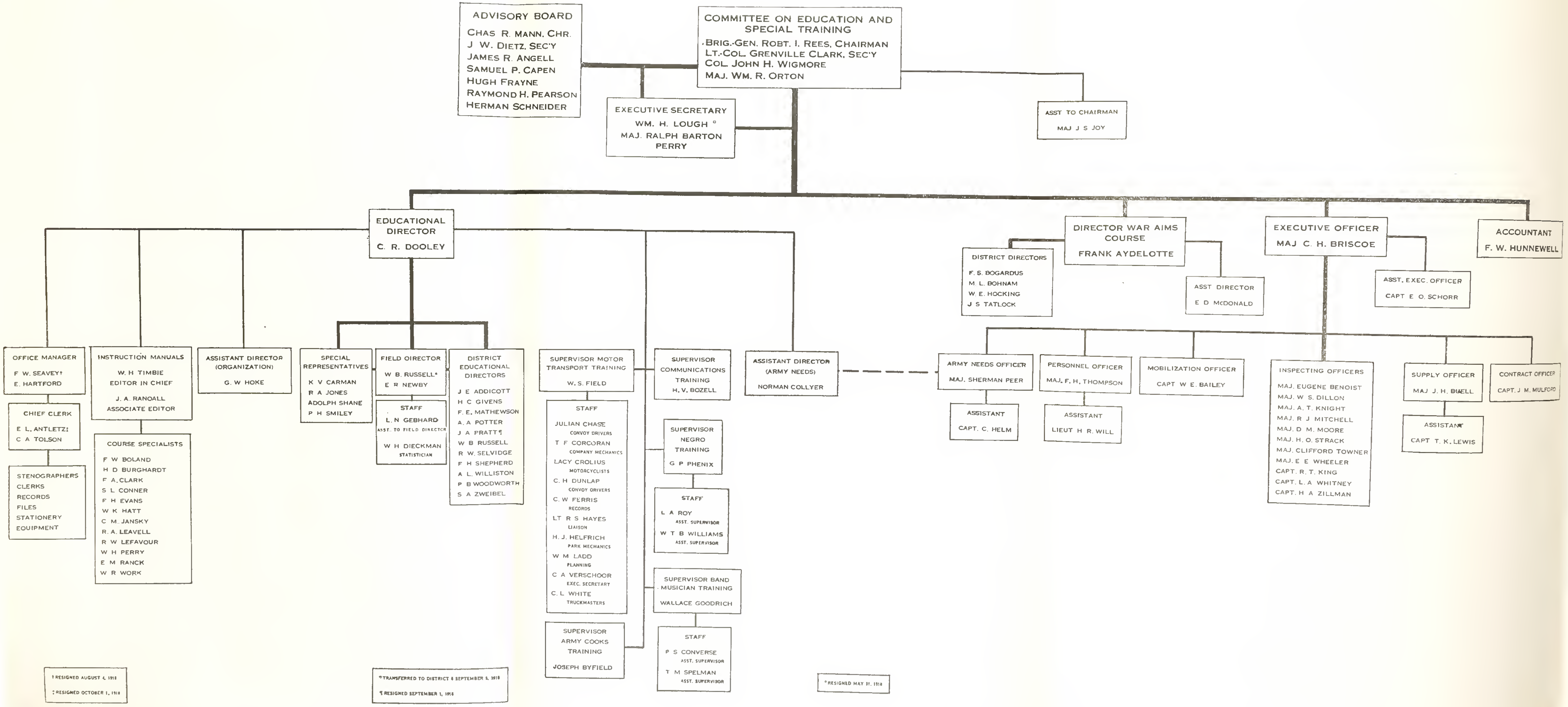
*Resigned September 1, 1918.

†Appointed Field Director July 7, 1918. Tranferred to District Director September 5, 1918.

The new arrangement of districts shown on page 20 and 25 become effective at this time.

ORGANIZATION CHART



† RESIGNED AUGUST 4, 1918

‡ RESIGNED OCTOBER 1, 1918

° TRANSFERRED TO DISTRICT 8 SEPTEMBER 5, 1918

¶ RESIGNED SEPTEMBER 1, 1918

* RESIGNED MAY 31, 1918

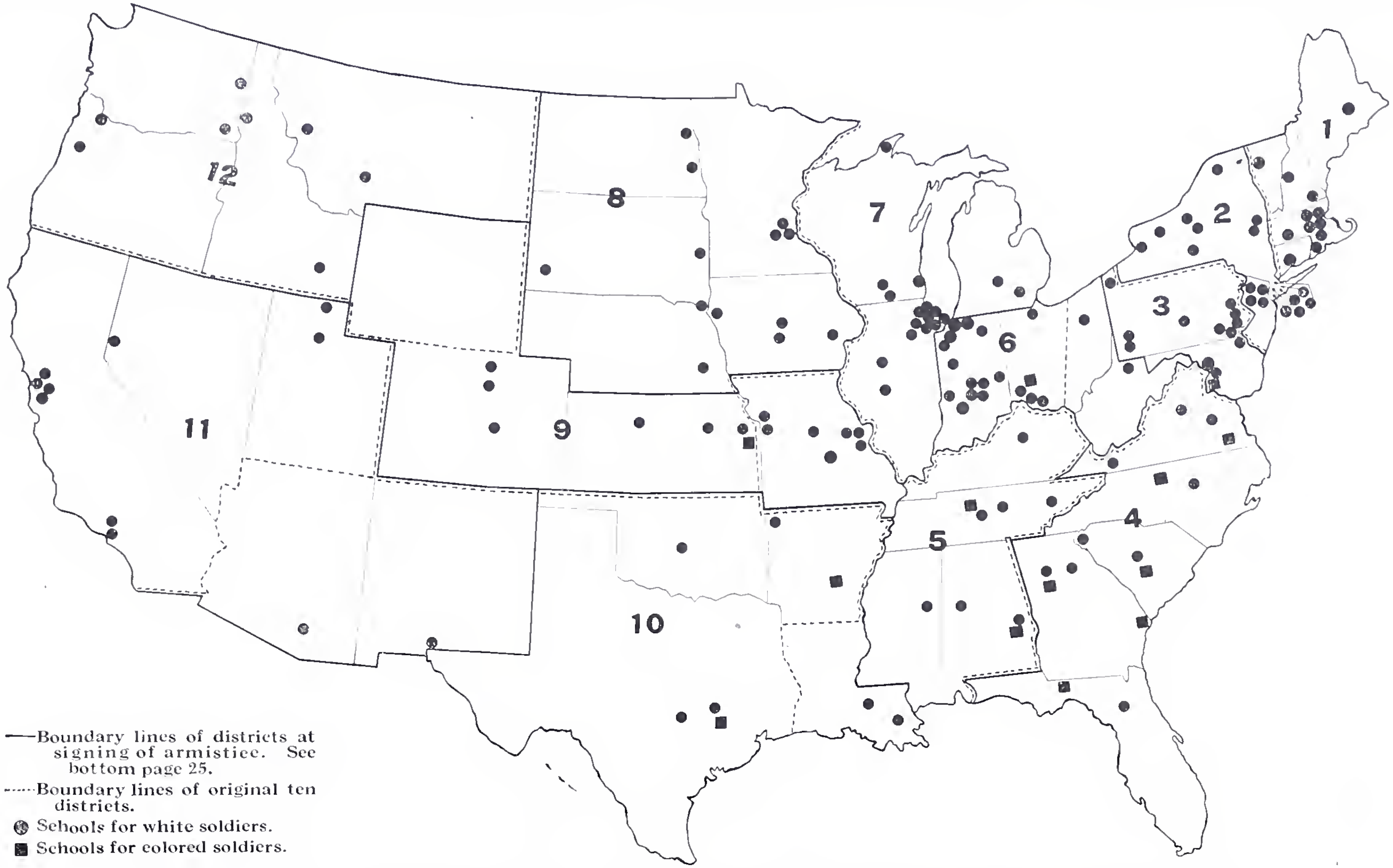
The following quotation from the appointment telegram sets forth the general conception of the duties of the District Educational Directors:

> "The Committee on Education and Special Training is organizing the United States into several Districts. Each district requires a manager to develop and supervise the work, and otherwise to represent the War Department in all educational matters. Will you accept . . . Plan involves mobilization of educational facilities of the nation to meet army demand for technicians which now exceeds one hundred thousand and is increasing. Every day brings telegrams and personal representatives from educational institutions throughout the country offering plants and unqualified active assistance which ensures enthusiastic cooperation."

All ten of the men selected as District Directors accepted the appointment and reported at Washington, April 9, for specific instructions.

A decision was made as to the trades in which men would be trained and the number that were needed in each, as nearly as could be determined with the information then available. The District Directors were informed that they would be held responsible for securing sufficient capacity to train the quota of men assigned to them, and each was impressed with the fact that on account of the shortage of time and the importance of getting the training work started at an early date, practically all decisions would be left in their hands. The central office at Washington made a practice of accepting these recommendations without question. The Directors' reports on equipment, instruction, supervision and total number of men were final. Their reports on courses to be taught and number of men in each were accepted, unless they were not in conformity with army requirements, in which case the directors were asked to recommend suitable changes. Thus a decentralized organization was established which proved satisfactory. It put the district director in a position where he must constantly exercise his best judgment and where he could speak with authority and get results. It also left the executives of the committee at Washington free to devote most of their attention to general policies and also the larger administrative matters.

On April 11 they returned to their several territories and began immediately to make a personal survey of the resources, facilities and attitude of the educational institutions in their respective districts. Upon approving each institution, the Director made a brief report by telegram, indicating his approval of equipment, instruction, supervision, courses and number of men to be trained. He also made a preliminary unofficial report on housing, mess, sanitation and drill grounds, and established preliminary contract relations, including approximate rate of charge. These latter items being purely military matters required official approval later by properly authorized military officers. Following the telegraphic report an expanded written report was made.


1
2
3
4
5
6
7
8
9
10
11
12
—Boundary lines of districts at signing of armistice. See bottom page 25.
-----Boundary lines of original ten districts.
● Schools for white soldiers.
■ Schools for colored soldiers.

Geographical Distribution of National Army Training Detachment

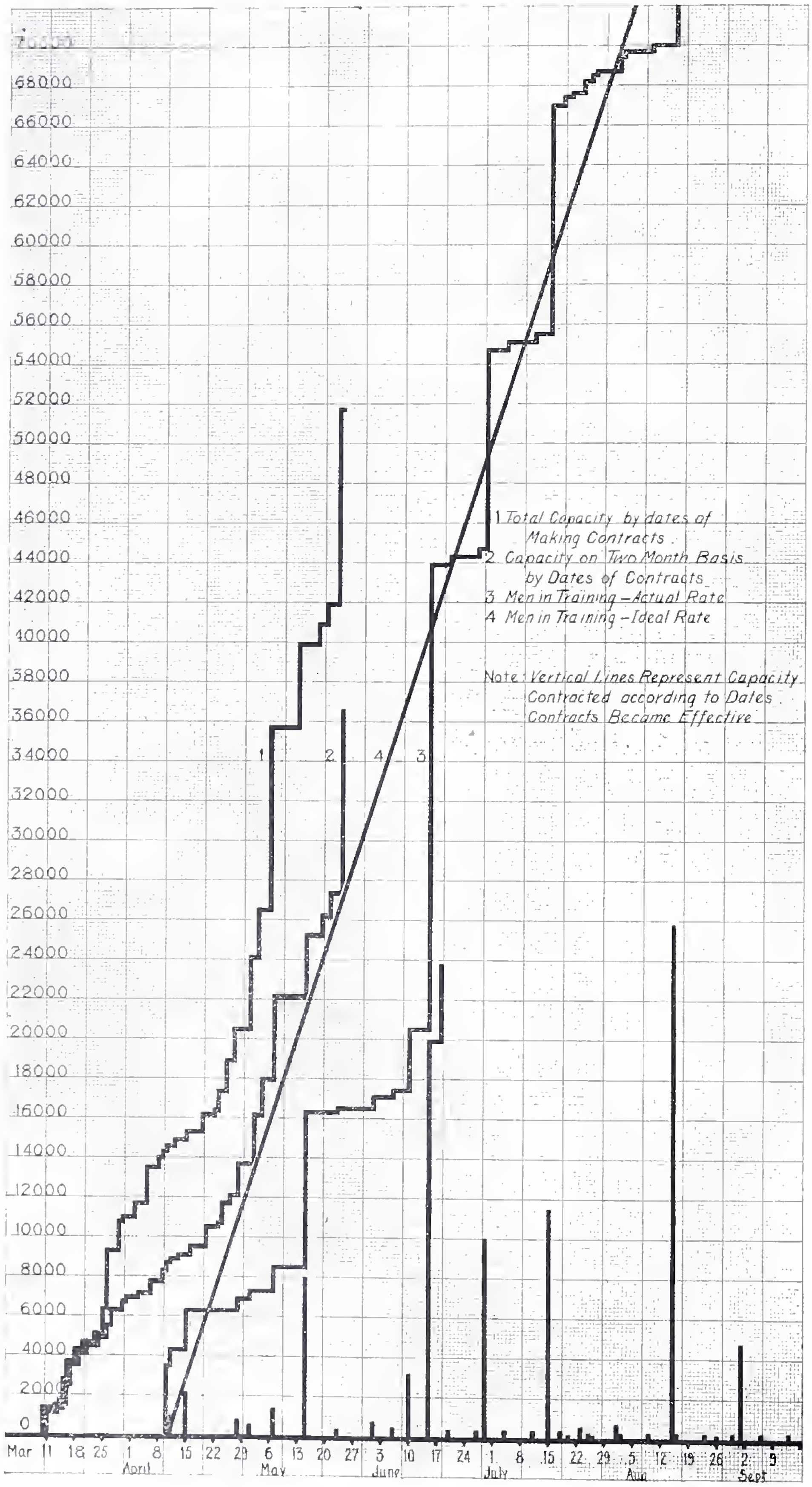
Immediately upon receipt at Washington of the approval by a District Educational Director, full information was given to the military executive officer of the committee, who notified his inspecting officer in the district concerned, to visit the institution and make an official report on all military matters, and if these were found satisfactory, to write the contract, secure the signature of the official representatives of the institution, and forward the papers to Washington for approval of the authorized military contracting officer of the committee.

A production chart in the Washington office recorded the accumulated totals of the daily reports from the District Directors, and showed how these compared with the results that were necessary in order to meet the entire program. For the next three or four weeks this chart was watched most eagerly as it was feared that it might be difficult to obtain a sufficient number of schools. So intensively did the Directors work, and so willing were the schools, that sufficient capacity to do the whole job then assigned to the committee was obtained May 1, and the danger line was thus passed.

After a sufficient number of contracts had been made the District Directors gave practically all of their attention to co-operating with the members of the educational staffs of the schools and advising them concerning the detailed requirements of the army in the various trades. The Washington office sent information continually to the District Directors which enabled them to give the schools a clear conception of just what sort of men the army wanted.

The District Directors took the attitude of helpfulness toward the schools in developing methods of conducting the training. While a general method was recommended and specifications of results to be attained were set up, yet the schools were allowed freedom in working out their own means of getting results. This method of supervision was found to be not only greatly appreciated by the school authorities, but very effective, and in the end the District Directors were able to carry the best experiences from school to school, thereby actually establishing standard methods.

The schools rose with fine spirit to the emergency. It should be recorded here that throughout the length and breadth of the land, educational institutions of all kinds volunteered their services completely and most enthusiastically. Those that were judged unsuitable because of location, equipment, inaccessibility or for other reasons, were greatly disappointed in not being able to serve the government. Further it should be recorded that while a great many of the schools had a considerable amount of mechanical equipment, such as machine shops, woodworking shops, electrical laboratories, etc., and while they had been accustomed to giving instruction along technical lines, using it as a part of the four-year college course, they had for the most part had no experience in short intensive trade training. The



Rate at which training capacity developed. U. S. Training Detachments, March 11 to Sept. 14, 1918.

spirit and effectiveness with which they set about to reorganize their staff of instructors and their equipment to meet this new type of education is not only a great expression of national patriotism, but a picturesque and lasting testimony to the resourcefulness, initiative and courage of our people.

There has been in general no thought either of personal gain or of profit to the institution. In fact, many schools have gone into debt for expenditures for which they can look only to the committee for reimbursement. Everywhere it was apparent that school authorities realized the urgent character of their undertakings and were actuated for the most part by no motive other than a desire to carry out the wishes of the War Department.

It is interesting to note that many types of schools responded to the request of the committee for assistance in giving vocational training to soldiers. The 157 institutions that were under contract with the committee are classified as follows:

Schools For White Men	
State Universities	20
State A. & M. Colleges	21
Combined Universities and A. & M. Colleges	13
Municipal Universities	6
Endowed Colleges and Universities	17
State Schools of Mines	4
Technical and Trade Schools	30
State Normal Schools	4
Boards of Education of City Schools	20
Chambers of Commerce	8
County Fair Associations	1
Total White Schools	144
Schools For Colored Men	
State A. and M. Colleges	1
Colleges and Universities	5
Trade Schools	5
Normal Schools	2
Total Colored Schools	13
Grand Total	157

DISTRICT 1—MAINE, NEW HAMPSHIRE, VERMONT, RHODE ISLAND, CONNECTICUT, MASSACHUSETTS

Brown University	Providence, R I
Dartmouth College	Hanover, N H.
Franklin Union	Boston, Mass.
Maine, University of	Orono, Me.
N. H College of A & M. Arts	Durham, N H
Newton School Board	Newton, Mass.
Rhode Island State College	Kingston, R. I.
Springfield Technical H. S.	Springfield, Mass
Tufts College	Medford, Mass.
Vermont, University of	Burlington, Vt.
Wentworth Institute	Boston, Mass.
Yale University	New Haven, Conn.

DISTRICT 2—NEW JERSEY, NEW YORK

Bayonne Board of Education	Bayonne, N J.
Buffalo Board of Education	Buffalo, N Y
Clarkson College of Technology	Potsdam, N Y
College of the City of New York	N Y City, N Y.
Columbia University	New York.
Cornell Univ (Sibley College)	Ithaca, N Y
Essex County Vocational School	W Orange, N J
Jersey City Brd. of Education	Jersey City, N J.
Newark Brd. of Education	Newark, N J
N Y. Brd. of Ed. Vocational School	New York.
N Y State College for Teachers	Albany, N. Y
New York University	New York.
Oswego State Normal School	Oswego, N Y.
Rochester A. & M. Institute	Rochester, N Y.
Saunders Trade School	Yonkers, N Y.
Syracuse University	Syracuse, N Y
Troy Central High School	Troy, N Y

DISTRICT 3—MARYLAND, DISTRICT OF COLUMBIA, DELAWARE, PENNSYLVANIA

Bliss Electrical School	Washington, D C
Bowman Technical School	Lancaster, Pa.
Carnegie Institute of Technology	Pittsburgh, Pa.
Delaware College	Newark, Del.
Erie School Board	Erie, Pa.
Howard University (Colored)	Washington, D C
Lafayette College	Easton, Pa.
Lehigh University	S Bethlehem, Pa.
Md. State College of Agriculture	College Pk., Md.
Pennsylvania State College	State College, Pa.
Pittsburgh, University of	Pittsburgh, Pa.
Polish National Alliance College	Cambridge Spgs., Pa
Spring Garden Institute	Philadelphia, Pa

DISTRICT 4—FLORIDA, GEORGIA, NORTH CAROLINA SOUTH CAROLINA, VIRGINIA.

Atlanta University (Colored)	Atlanta, Ga
Colored Normal Ind. A & M. College	Orangeburg, S C
Clemson Agricultural College	Clemson, S C.
Florida A. & M (Colored)	Tallahassee, Fla.
Florida, University of	Gainesville, Fla.
Georgia School of Technology	Atlanta, Ga.
Georgia State Industrial College (Colored)	Savannah, Ga.
Georgia, University of	Athens, Ga
Hampton Normal & Agr Institute (Colored)	Hampton, Va.
Negro Agr. & Tech. College (Colored)	Greensboro, N C
N C. College of A. & M. Arts	W Raleigh, N C
Richmond City School Board	Richmond, Va.
Virginia Polytech. Institute	Blacksburg, Va.
Virginia, University of	Charlottesville, Va.
University of South Carolina	Columbia, S. C.

DISTRICT 5—ALABAMA, KENTUCKY, MISSISSIPPI, TENNESSEE.

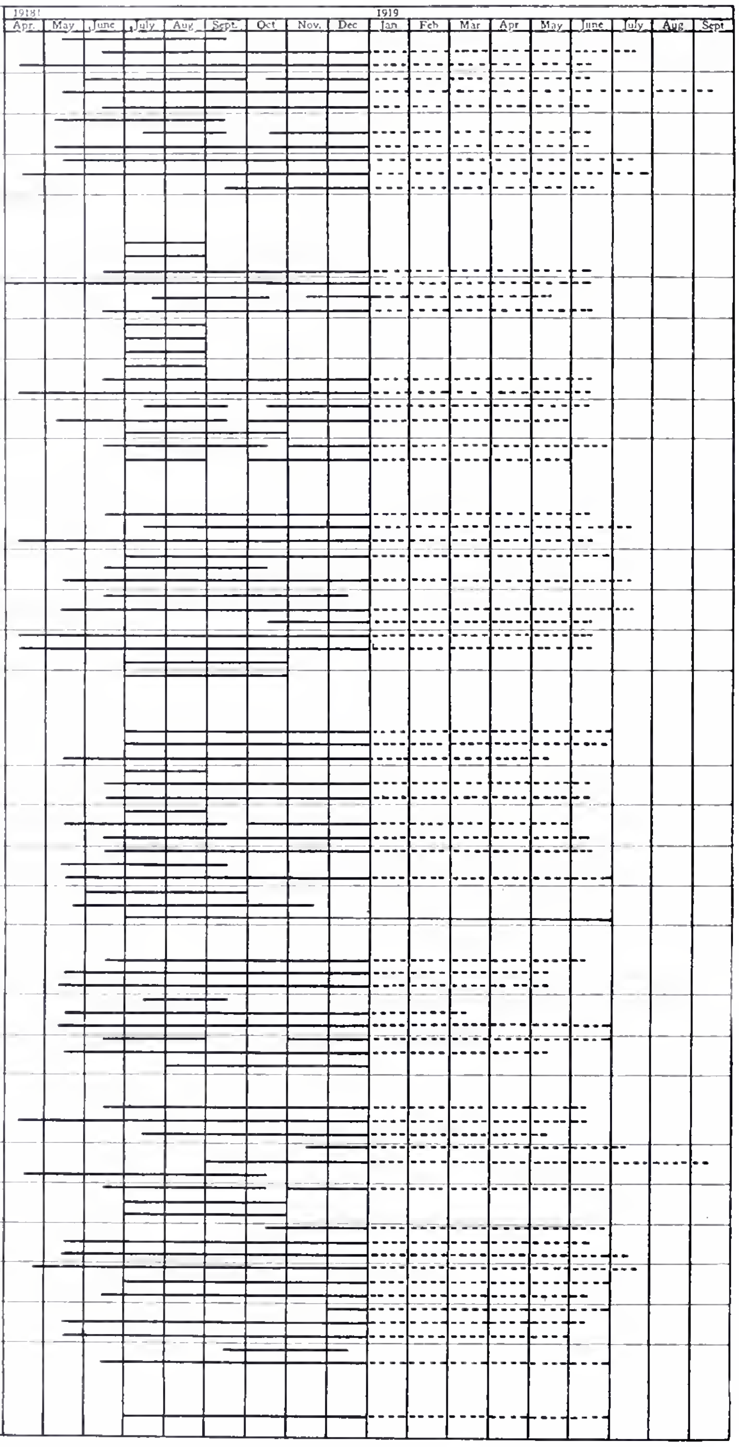
Alabama Polytechnic Institute	Auburn, Ala.
Alabama, University of	Tuscaloosa, Ala.
Kentucky, University of	Lexington, Ky.
Middle Tenn. State Normal School	Murfreesboro, Tenn.
Mississippi A. & M College	Starkville, Miss
Tennessee, University of	Knoxville, Tenn.
Tennessee Polytechnic Institute	Cookville, Tenn.
Tuskegee Institute (Colored)	Tuskegee Ala
Fisk University (Colored)	Nashville, Tenn.

DISTRICT 6—INDIANA, OHIO, WEST VIRGINIA

Cincinnati Board of Education	Cincinnati, Ohio
Cincinnati, University of	Cincinnati, Ohio
Combined Nor & Ind. School (Colored)	Wilberforce, Ohio
Dodge Telegraphic Institute	Valparaiso, Ind.
Indiana University	Bloomington, Ind.
Ind. Chamber of Com.—Hotel Metropole	Indianapolis, Ind.
Ind. Chamber of Com.—Deal Asylum	Indianapolis, Ind
Ind. Chamber of Com.—Arsenal	Indianapolis, Ind.
Ind. Chamber of Com.—Blind School	Indianapolis, Ind.
Interlaken School	Rolling Prairie, Ind.
Municipal University of Akron	Akron, Ohio
Ohio Mechanics Institute	Cincinnati, Ohio
Purdue University	Lafayette, Ind.
Richmond Commercial Club	Richmond, Ind.
Rose Polytechnic Institute	Terre Haute, Ind
St. Joseph County Fair & Amus Co.	South Bend, Ind.
Toledo University	Toledo, Ohio
Valparaiso University	Valparaiso, Ind.
Warsaw Chamber of Commerce	Warsaw, Ind.
West Virginia, University of	Morgantown, W Va

DISTRICT 7—ILLINOIS, MICHIGAN, WISCONSIN

Armour Institute of Technology	Chicago, Ill.



Schools by Districts

Full lines show periods when training detachments were in operation. Dotted lines show periods from demobilization date to termination dates of contracts.

DISTRICT 7—(Continued)

Beloit College	Beloit, Wis.
Bradley Polytechnic Institute	Peoria, Ill.
Chi Board of Education (Brennan)	Chicago, Ill
Chi. Board of Education (Harrison)	Chicago, Ill
Chi Board of Education (Old S Div H S.)	Chicago, Ill.
Chi. Bd. of Ed (Wendell Phillips)	Chicago, Ill.
Chicago, University of	Chicago, Ill.
Lewis Institute	Chicago, Ill.
Loyal Order of Moose	Mooseheart, Ill.
Michigan School of Mines	Houghton, Mich
Michigan Agricultural College	E Lansing, Mich.
Michigan, University of	Ann Arbor, Mich
Milwaukee Association of Commerce	Milwaukee, Wis
Northwestern University	Evanston, Ill.
Springfield Commercial Asso	Springfield, Ill.
Wisconsin, University of	Madison, Wis.

DISTRICT 8—IOWA, MINNESOTA, NEBRASKA, NORTH DAKOTA SOUTH DAKOTA

Des Moines College	Des Moines, Iowa
Dunwoody Institute	Minneapolis, Minn
Iowa State College of A & M Arts	Ames, Iowa
Iowa, University of	Iowa City, Iowa
Minnesota, University of (Agr Col)	St Paul, Minn.
Minnesota, University of (Eng Col.)	Minneapolis, Minn
Nebraska, University of	Lincoln, Nebr.
North Dakota Agr College	Fargo, N D
North Dakota School of Mines	Grand Forks, N. D
Sioux City High School	Sioux City, Iowa
South Dakota School of Mines	Rapid City, S. D
S D. College of A. & M Arts	Brookings, S. D
South Dakota, University of	Vermillion, S. D

DISTRICT 9—COLORADO, KANSAS, MISSOURI

Colorado College	Colo. Springs, Colo.
Colorado Agricultural College	Fort Collins, Colo.
Colorado, University of	Boulder, Colo.
Fort Hays Normal School	Hays City, Kans.
Kansas State Agricultural College	Manhattan, Kans.
Kansas, University of	Lawrence, Kans.
Missouri School of Mines	Rolla, Mo
Missouri, University of	Columbia, Mo.
Rahe Auto and Tractor School	Kansas City, Mo.
Rankin Trade School	St. Louis, Mo.
St. Louis Board of Education	St. Louis, Mo.
Sweeney Auto and Tractor School	Kansas City, Mo
Washington University	St. Louis, Mo
Western University (Colored)	Quindaro, Kans

DISTRICT 10—ARKANSAS, LOUISIANA, OKLAHOMA, TEXAS

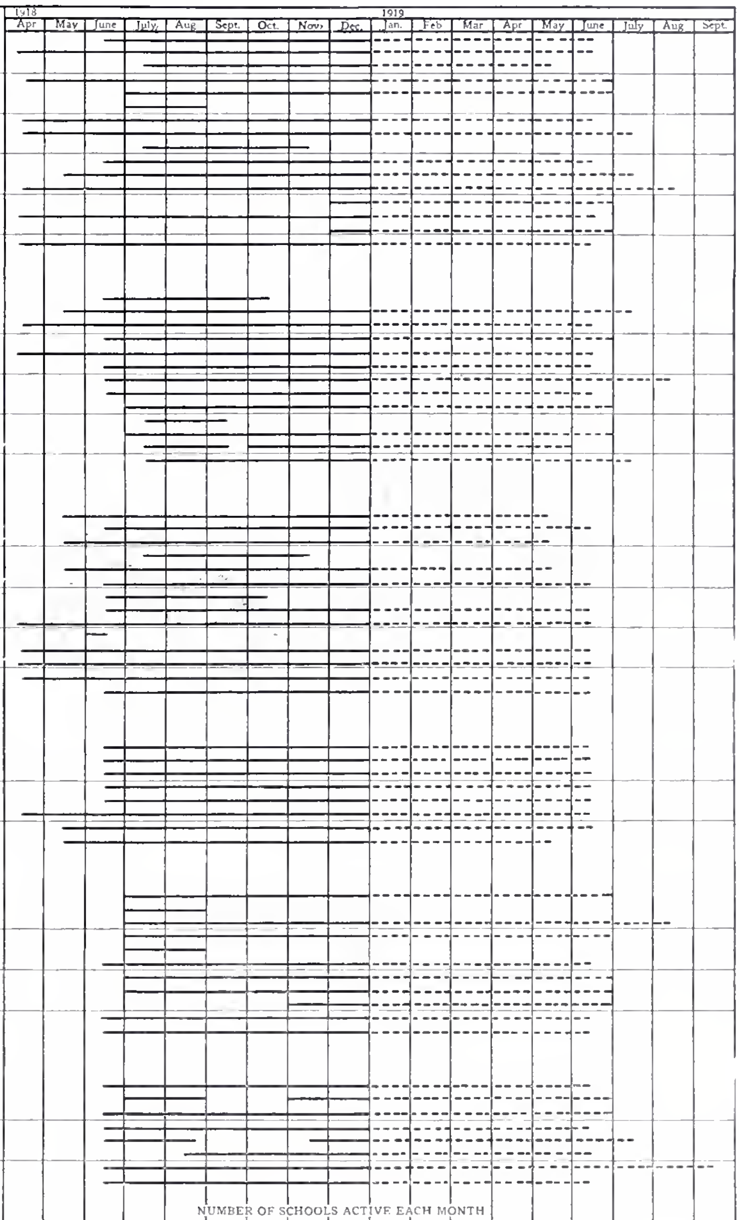
Arkansas, University of	Fayetteville, Ark.
Branch Normal College (Colored)	Pine Bluff, Ark.
Louisiana State University	Baton Rouge, La
Oklahoma, University of	Norman, Okla
Prairie View State Nor & Ind Col (Col)	Prairie View, Tex.
Texas A & M College	College Station, Tex
Texas, University of	Austin, Tex.
Tulane University	New Orleans, La

DISTRICT 11—ARIZONA CALIFORNIA, NEVADA, NEW MEXICO, UTAH

Arizona, University of	Tucson, Ariz.
California School of Mechan Arts	San Francisco, Cal
California, University of	Berkeley, Cal.
Los Angeles State Normal School	Los Angeles, Cal
Los Angeles High School	Los Angeles, Cal
Nevada, University of	Reno, Nev.
New Mexico College of A & M Arts	State College, N M
Oakland Technical High School	Oakland, Cal.
Polytechnic School of Engineering	Oakland, Cal.
Utah Agricultural College of	Logan, Utah
Utah, University of	Salt Lake City Utah

DISTRICT 12—IDAHO, MONTANA, OREGON, WASHINGTON

Benson Polytechnic Institute	Portland, Ore
Idaho School of Technology	Pocatello, Idaho
Idaho, University of	Moscow, Idaho
Modern Automobile School	Spokane, Wash.
Montana State College of A & M Arts	Bozeman, Mont.
Montana, University of	Missoula, Mont
Oregon Agricultural College	Corvallis, Ore
Washington, State College of	Pullman, Wash.



SUMMARY BY DISTRICTS

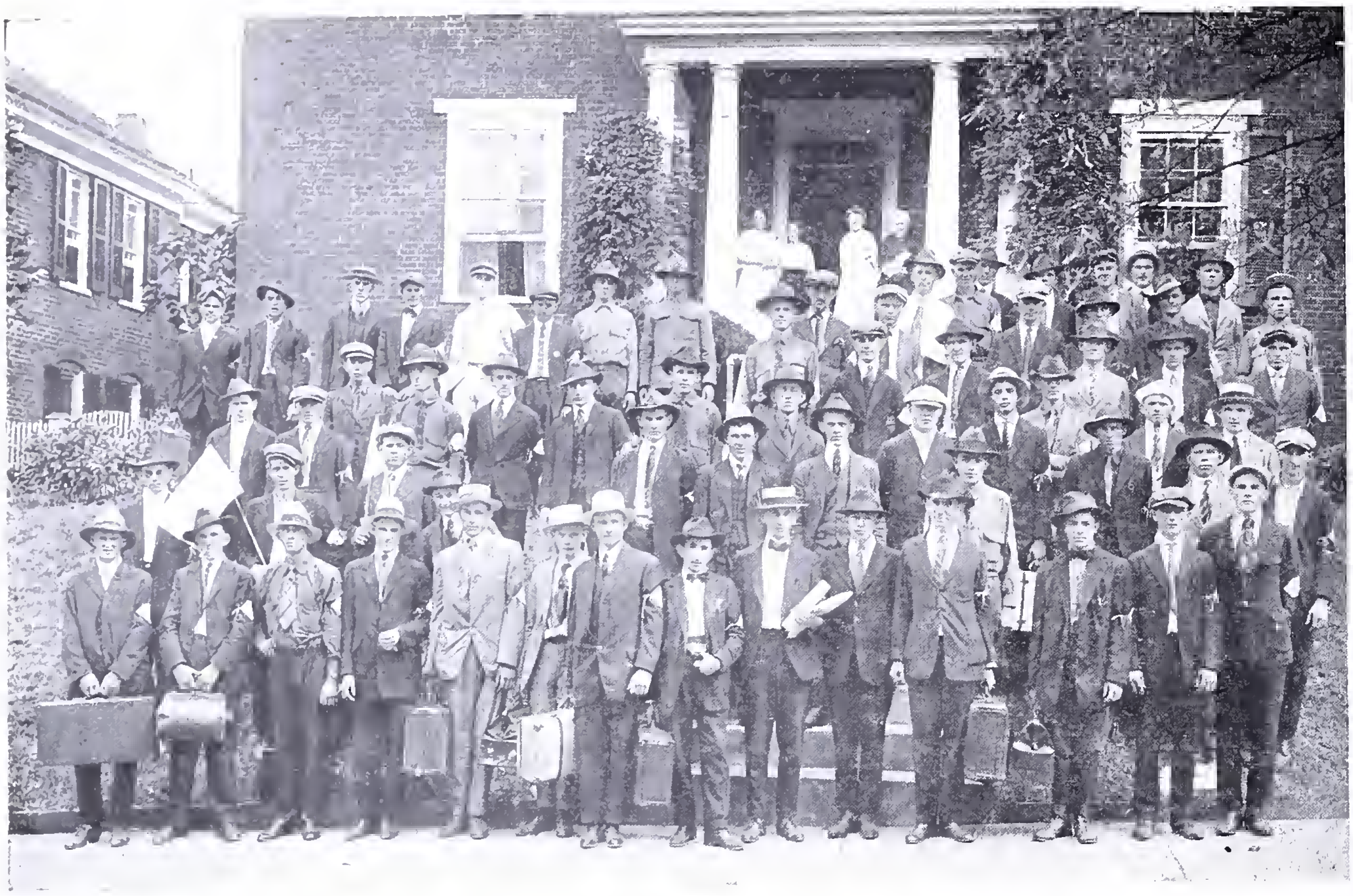
District 1	A L Williston	Director	12 Schools
District 2	F E Mathewson,	Director	17 Schools
District 3	S A Zwerber	Director	13 Schools
District 4	R W Selvidge	Director	15 Schools
District 5	R W Selvidge	Director	9 Schools
District 6	W B Russell	Director	20 Schools
District 7	P B Woodworth	Director	17 Schools
District 8	A A Potter	Director	13 Schools
District 9	A A Potter	Director	14 Schools
District 10	H C Givens	Director	8 Schools
District 11	J E Addicott	Director	11 Schools
District 12	F H Shepherd	Director	8 Schools
GRAND TOTAL			157 Schools

NUMBER OF SCHOOLS ACTIVE EACH MONTH

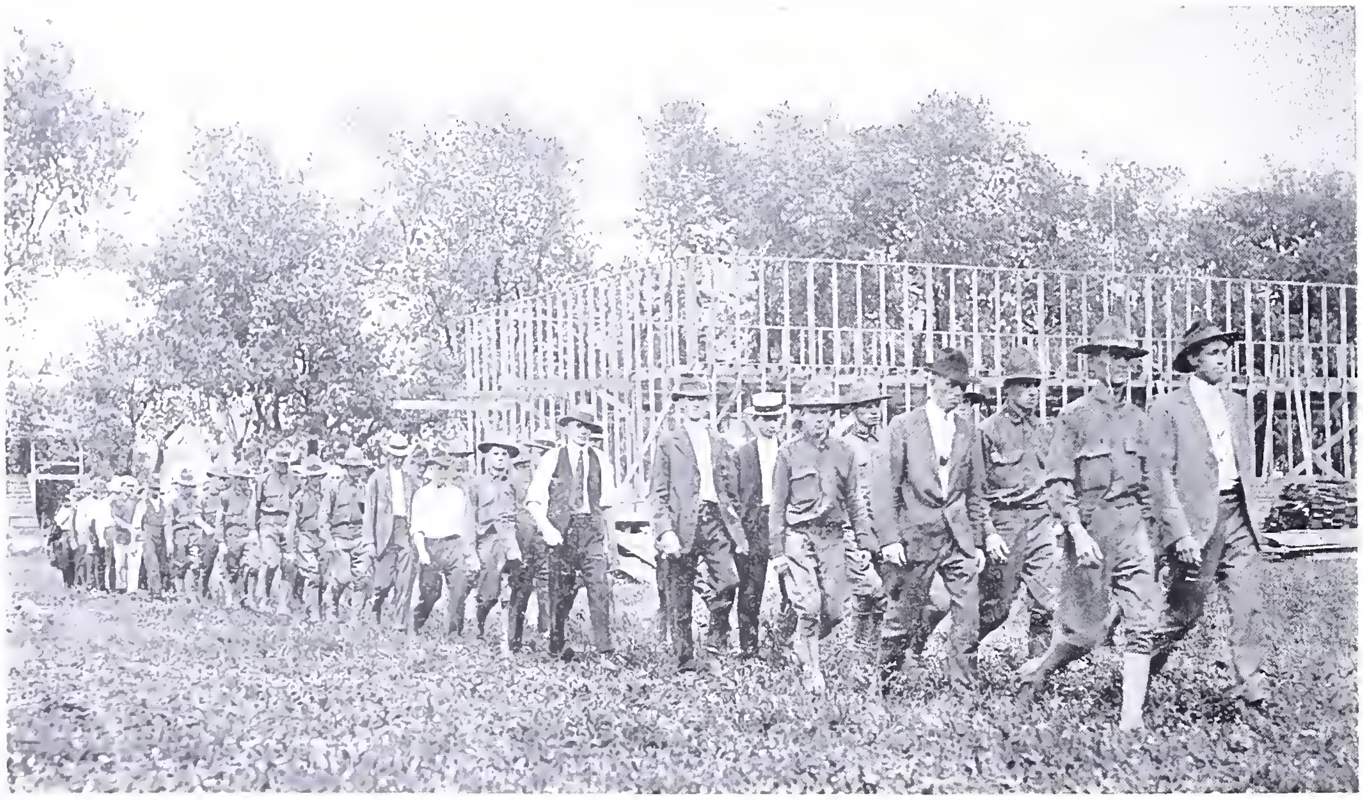
	1918 Apr	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.	1919 Jan.	Feb	Mar	Apr	May	June	July	Aug	Sept.
District 1	2	7	10	10	11	12	10	10	10	10	10	10	10	10	10	4	1	1
District 2	1	2	6	16	16	9	10	9	9	9	9	9	9	9	9	0	0	0
District 3	3	6	9	12	12	12	13	10	10	9	9	9	9	9	9	3	0	0
District 4	0	4	9	15	15	13	10	11	10	10	10	10	10	10	8	0	0	0
District 5	0	5	7	8	9	8	7	8	8	7	7	7	6	6	3	0	0	0
District 6	4	6	10	14	14	16	17	16	17	16	16	16	16	16	14	4	1	1
District 7	5	6	10	15	15	14	14	13	14	14	14	14	14	14	14	3	1	0
District 8	2	3	8	13	13	13	12	11	11	11	11	11	11	11	10	3	1	0
District 9	4	8	12	13	13	13	13	12	11	11	11	11	11	11	8	0	0	0
District 10	1	3	8	8	8	8	8	8	8	8	8	8	8	8	7	0	0	0
District 11	0	0	3	10	10	8	8	9	9	9	9	9	9	9	9	1	1	0
District 12	0	0	6	7	8	6	6	7	7	7	7	7	7	7	7	1	1	1
GRAND TOTAL	22	50	98	141	144	132	128	124	124	121	121	121	120	120	108	19	6	3

Schools by Districts

Full lines show periods when training detachments were in operation. Dotted lines show periods from demobilization date to termination dates of contracts.



Raw material just arrived
University of Virginia Training Detachment



Raw material in process of transportation. Carpentry section of University of Kentucky Training Detachment.

NATIONAL ARMY REQUISITIONS

The number of men in each trade requested of the committee by each corps of the army is shown on page 28. In some trades the committee endeavored to train the full quota of men asked for, while in others it was expected that a good portion of such men would be secured from the draft, and the committee therefore made its contracts accordingly. In about thirty of these trades no contracts had been made, although at the time the armistice was signed, negotiations were under way which would undoubtedly have led to contracts in a number of them, within the next few days.

FIRST ARMY REQUISITION, MADE MARCH, 1918

	No. of Men	Per cent of Total
Auto Trades	52,000	70
Blacksmiths	3,000	3.6
Carpenters	4,300	5.4
Benchwood	1,000	1.2
Concrete	700	.88
Electricians	3,000	3.7
Instrument Repair	1,000	1.3
Machinists	700	.88
General Mechanics	1,700	2.1
Mine Drill Runners	500	.6
Vulcanizers	560	.7
Sheet Metal	600	.18
Telegraphers	1,600	1.9
Radio Constructors	1,300	1.6
Wireless Operators	4,000	4.9
Total	85,960	100%

The question of how many men should be trained in each trade, was decided in March largely on an estimated percentage basis rather than on request for actual numbers of men from the Army. There was no other basis upon which computation could be made at that time.

REQUESTS FROM VARIOUS ARMY CORPS FOR TECHNICALLY TRAINED MEN IN TERMS OF MONTHLY REQUIREMENTS

Men wanted November 1, 1918 to June 30, 1919.

Occupation	Field Artillery	Coast Artillery	Ordnance	Motor Transport Corps	Signal Corps	Machine Gun Service	Infantry less Machine Gun Units	Engineers Corps	Military Aeronautics	Total
Airplane Enginemen									507	507
Airplane Mechanics									388	388
Airplane Riggers									317	317
Auto Drivers	420	764		127					389	1700
Auto Mechanics	708	419	833	4101		8		218	20	6307
Automotive Engineers		104								104
Auto Truck Drivers Heavy				7000						7000
Band Musicians						32				32
Blacksmiths	41	96		260				124	20	541
Boilermakers								88		88
Cabinet Makers									20	20
Carpenters	197	14		6				180	3	400
Car Repairers		7						50		57
Chauffeurs	1734			1500		250				3484
Checkers			178							178
Clerks and Stenographers		262	178					219		659
Cobblers	356					16		66		438
Compressor Operators								35		35
Concrete Foremen								81		81
Construction Foremen		104						131		235
Cooks			40							40
Draftsmen, General		32						205		237
Draftsmen, Topographical	210	96						175		481
Electricians			22	11				267	47	347
Electricians, Searchlight		8								8
Fabric Makers									44	44
Farriers	192					4	96	44		336
Field Signal Battalion Officers					110					110
Foresters (Sawmill Workers)								44		44
Foundrymen								66		66
Gas Engine Men								92		92
Gas Engine Locomotive Men								88		88
Gas Plant Workers (oxy. hydro. acet.)								31		31
Guage Makers			50							50
Gunsmiths			539			133				672
Highway Construction Foremen		15								15
Horseshoers	425					72	494			991
Instrument Repairmen								50	20	70
Leather Workers	124			58				44		226
Lithographic Pressmen								44		44
Lithographic Pressmen, Rotary								44		44
Lithographic Transfermen								25		25
Locomotive Engineers		53						218		271
Locomotive Machinists		18								18
Machinists	270		213	286				761	27	1557
Mechanics, Battery	88		418							506
Mechanics, General		8	321				934	514		1777
Mechanics, Wagoners	115			533						648
Meteorologists					30					30
Military Photographers					100					100
Mine Drill Runners								197		197
Motorcycle Repairmen		401	132	100		5				638
Motorcyclists	222	1412		400					98	2132
Multiplex Telegraphers					30					30
Officer Candidates, Signal Corps					110					110
Pipe Fitters (Plumbers)				21				414		435
Process Printers								44		44
Propeller Makers									20	20
Radio Electricians	72	64			1600					1736
Radio Operators	343	801			1000				400	2544
Railroad Trackmen		6								6
Railroad Trainmen		53						262		315
Riveters			66							66
Rubber Workers				217				88	20	325
Saddlers	398					65				463
Sheet Metal Workers				118				76	45	239
Storekeepers			178							178
Structural Iron Workers								372		372
Surveyors	533	593						332		1458
Tailors								60		60
Telegraphers					50					50
Telephone Electricians	953	15			400			88		1456
Telephone Linemen	537	8						118		663
Timbermen								350		350
Topographical Computers								150		150
Tractor Operators	3158			21						3179
Truck Drivers	7517	894						218		8629
Truckmasters	1434	385		400						2219
Truckmaster Sergeants						6				6
Veterinarians								10		10
Welders, Gas			72	137				131	20	360
Well Drillers								26		26
Wet Plate Photographers								26		26
Wheelwrights				240		54				294
Yard Clerks								22		22
Yardmasters								48		48
TOTAL	20,047	6,632	3,240	15,536	3,430	645	1,524	6,936	2,405	60,395

NOTE: Army Needs not estimated for Motor Transport Corps beyond Dec. 31, 1918, nor for Division of Military Aeronautics beyond Jan. 31, 1919, nor for Ordnance Department beyond April 15, 1919.

FUNDAMENTAL OBJECT IN THE TRAINING

First of all the men must be soldiers, disciplined to prompt and complete obedience, well trained in military maneuvers, thoroughly acquainted with all regulations, able to function in a military organization, and broken into the routine of Army life; second, they must be skilled in those trade specialties needed in the Army; third, they must have that originality and initiative which will enable them as soldiers to use tools and materials at hand in meeting emergencies.

This is clearly set forth in instructions to Commanding Officers at the schools early in the summer, from which the following is quoted:

> "The purpose is in part to train men vocationally for a few particular duties in the Army requiring specialized technical skill; for example, telegraph operators and locomotive engineers. Special effort is made that such men are assigned strictly in accordance with their training. The further purpose, however, is to develop generally the men's resourcefulness and initiative. The army is not a collection of men in trade occupations, but is an organization in which the men are first and last, soldiers, many of whom possess special vocational ability as a part of their equipment. It must be understood also that certain kinds of technical skill constitute an asset in all branches of the service and are valuable in combatant units as well as in specialized staff corps organizations. A large proportion of the men from the National Army Training Detachments will be assigned to infantry units (especially trains and machine gun units) and to the Field Artillery. In these organizations their vocational training will be put to the best possible use."

The true American soldier understands the cause for which he fights. Therefore, one hour a week was devoted to a series of discussions concerning the issues of the war. These discussions dealt with the differences in the forms of governments of the nations at war, the economic conditions, the historical facts that preceded the outbreak of hostilities, the social conditions in the different nations and the war literature. The work was in no sense a propaganda but an effort to supply the soldier with reliable information that would enable him to answer his own questions concerning the reasons why the country was at war.

In order that the strictly educational part of the program should be as effective as possible in producing the soldier mechanic as above described, the following statement was widely distributed to all schools under the caption of educational ideals.

INSTRUCTION MANUAL No. 1

"There are two fundamentals that the Committee wishes to impress upon instructors:

> **1. An efficient instructor must be accurately informed as to what jobs a carpenter, or a blacksmith, for instance, may be called upon to do in the Army.**
>
> **2. Methods of instruction must be used which in the time available will best train men to do these jobs.**

To assist instructors in these two important respects, new course outlines are being prepared by the Committee on Education and Special Training. As soon as completed they will be issued to the co-operating schools.

These outlines are sufficiently definite to make their use productive of the degree of specialization required by the various Army Corps; yet they are also sufficiently flexible to allow for that broader development of resourcefulness and initiative which are essential to the men in the army. Results to be obtained have been set down rather than detailed methods of accomplishing them. Further details can be developed at each institution through the ingenuity of the instructors in charge.

A promotion program is preferable to a rotating one. It is not desirable to follow rigidly a plan which provides that all students get a definite length of time on each of a number of specified subjects in rotation, though such a program may be suited to the most able men.

The work should be organized so that while the most able men will get the entire course of instruction, others will omit those subjects for which they have no special aptitude, giving full time and attention to those things in which they show promise of success. In general this means a course arranged not for the average but for the best student and then administered so that only those men who show or develop ability on one job will be promoted to the next more difficult task.

To illustrate: In the auto-mechanics squad only those men who have thoroughly mastered the details of the axle and wheel work will progress to engine work, and then again only those who show a good understanding of engine performance will take up further study of gas engine repairing. Again, only those who show special all-around ability in these things will proceed further with the study of ignition, timing and the more complex details of operation.

In a given course all men need not start on the same job and all those promoted need not take up the same advanced work. There are several points in each course where men may be started. Obviously a man's first job should be of sufficient simplicity for him to proceed intelligently. All jobs should be reasonably sequential and should present real problems, the working out of which will equip the men with first hand knowledge of practical details of construction or operation and provide a background for the understanding of scientific principles. The important factor in shifting men from one job to the next is that the instructor maintain the idea and spirit of promotion as to both practical accomplishment and understanding of fundamental principles. In short the educational program all the way through shall present an opportunity for native ability and previous experience to assert itself, and train men along the lines they are fitted to go and only as far as they can make real progress. At the end of the course each man will be rated, not on his average proficiency in all the work, but by listing the kinds of work he can do well.

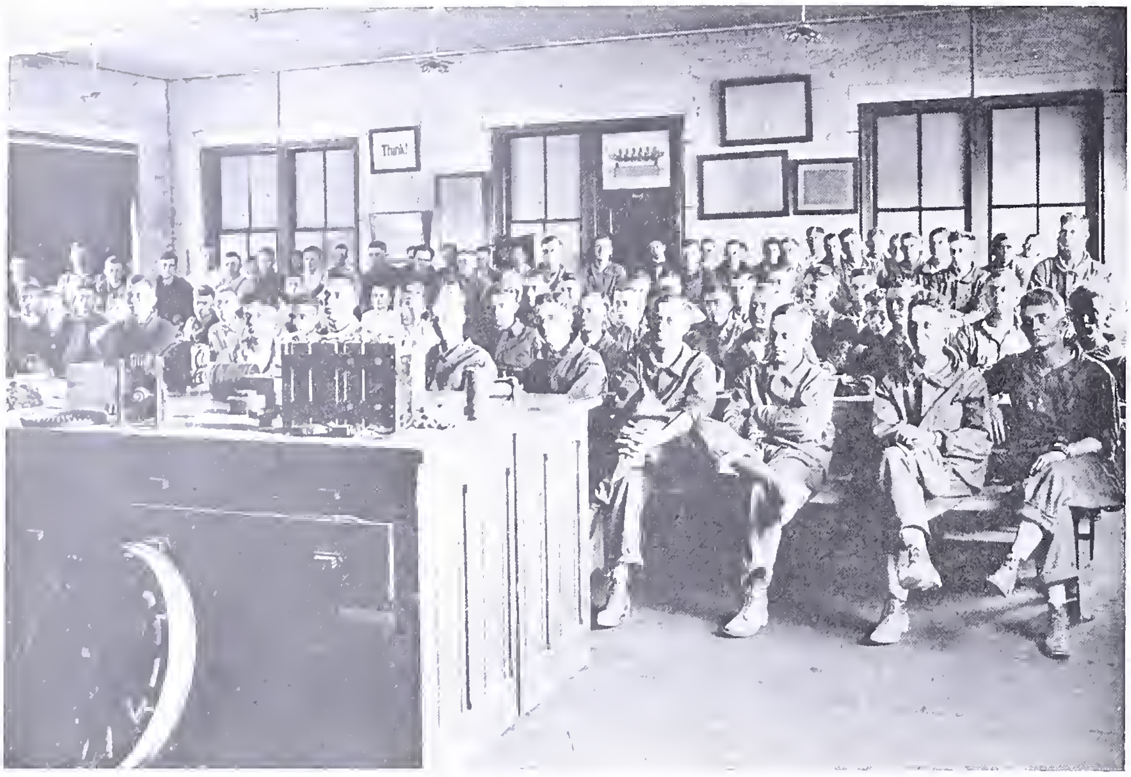
In order to provide for the development of originality, initiative and real thinking power, and also to prevent learning by rule-of-thumb, the teaching should be almost entirely through jobs, questions, problems and guided discussions.

These course outlines are not intended for the schoolroom but for the shop where they can be used for the guidance of the instructors and the men on the job. The frequent gathering of the men in small groups before a blackboard in the shop where live material is available for demonstration, discussion and conference is far preferable to the practice of formal lectures to large groups.

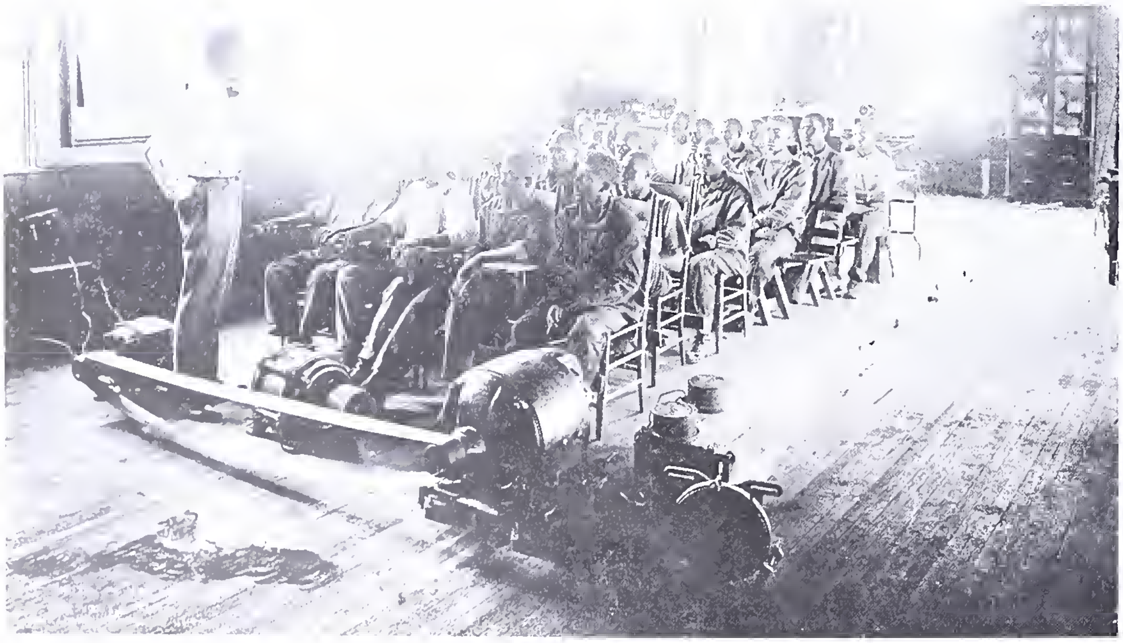
The accomplishment of a job is both the end to be attained and the means for instruction.

These ideals may not be new but are stated here as representing the composite convictions of all who are associated in the responsibility and conduct of this work."

Bridge carpenters at work. This bridge was completely built by students from green timber, rock foundation; masonry wall was also made by the students. Polish National Alliance.



The job of the Committee of Education and Special Training of the War Department was to train men of draft age for the United States National Army along specialized technical lines, irrespective of nationality, race, intelligence and education



SELECTION OF MEN FOR VOCATIONAL TRAINING DETACHMENTS

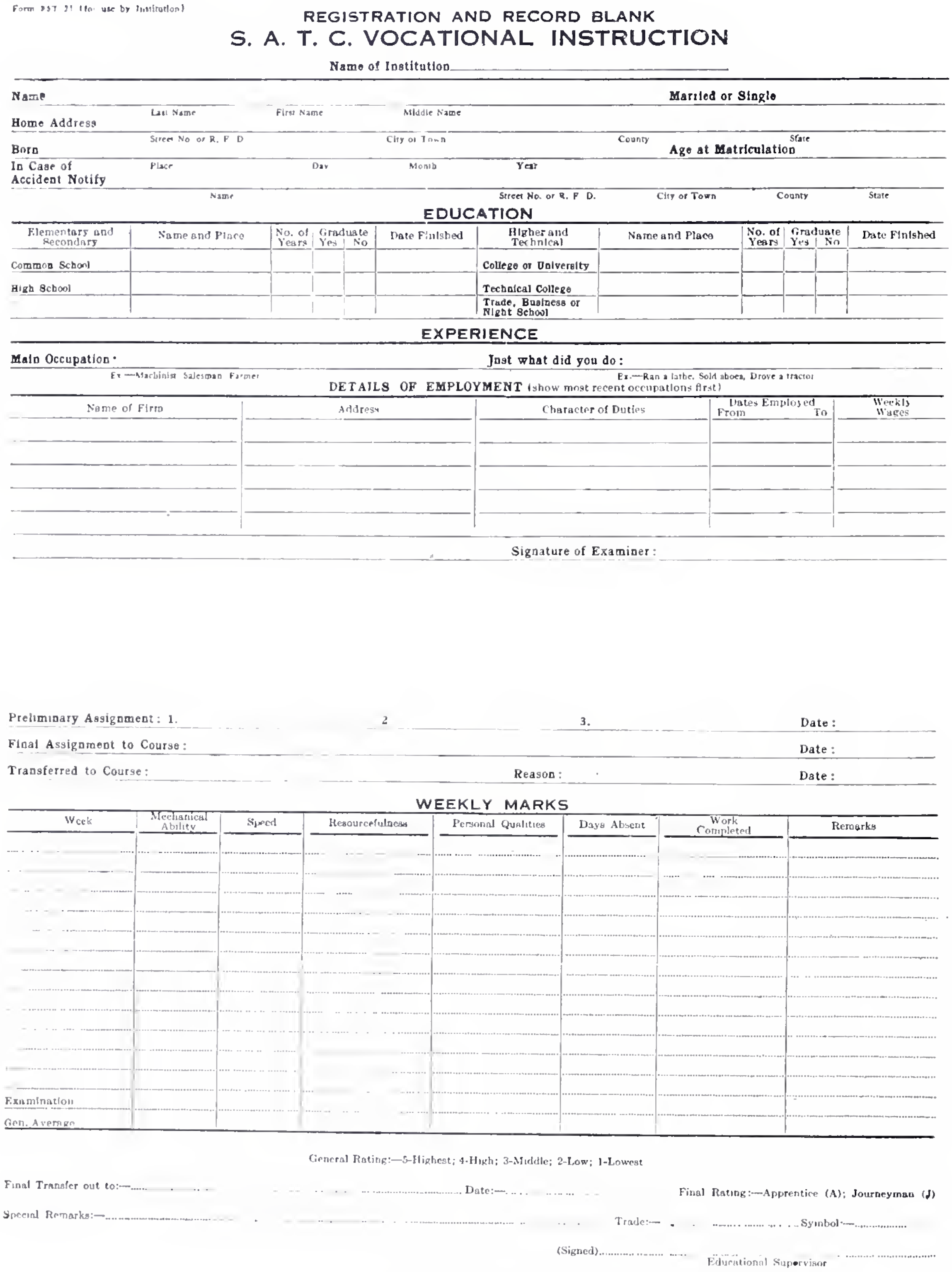
All calls for men to take the vocational training were issued to the draft boards by the Provost Marshal's office on the basis of information furnished by the Committee as to the numbers of men, location of institutions and dates when they were due to report. In so far as possible these call orders indicated the kind of training to be given at each institution, the number of men desired and asked that men of some previous training in these various trades volunteer for induction. On the whole the latter phase of this request did not function thoroughly, as many men, entirely lacking in suitable experience were sent to the various detachments.

At first this was very disconcerting to the school officials, but administrative difficulties made it impossible to exercise a greater degree of selection, and the problem resolved itself into one of training such men as came.

This plan would have made it possible to secure men of proper foundation for the vocational training and would thus presumably have enabled the schools to turn out a higher grade of workers. Shortage of men and other difficulties, however, made it impracticable to carry out this plan.

The degree of success attained by the men totally inexperienced in the vocations, in which they were receiving training, astonished everyone and gave the schools increased confidence in handling the miscellaneous kinds of men sent for training.

Farmers totally ignorant of the tinsmith trade produced work of commercial quality including the making of their own patterns and involving principles of descriptive geometry; bank clerks did excellent work in pattern making; real estate agents acquired great skill and enthusiasm in electric wiring; garment makers who had never seen a piece of hot iron became good general blacksmiths. Complete failures were so rare as to be recorded negligible. It is difficult to conclude that the best results were obtained where the training given supplemented previous experience. Hundreds of men found that they were better adapted to the new line of work and yet other hundreds who had previously known no special trade, or occupation became vitally interested in some of the fundamental technical phases of trade work and thus found an entirely new interest in life.



Form PST 21 (for use by Institution)

REGISTRATION AND RECORD BLANK

S. A. T. C. VOCATIONAL INSTRUCTION

Name of Institution

Name Last Name First Name Middle Name **Married or Single**

Home Address Street No. or R. F. D. City or Town County State

Born Place Day Month Year **Age at Matriculation**

In Case of Accident Notify Name Street No. or R. F. D. City or Town County State

EDUCATION

Elementary and Secondary	Name and Place	No. of Years	Graduate Yes	Graduate No	Date Finished	Higher and Technical	Name and Place	No. of Years	Graduate Yes	Graduate No	Date Finished
Common School						College or University					
High School						Technical College					
						Trade, Business or Night School					

EXPERIENCE

Main Occupation: Ex.—Machinist Salesman Farmer

Just what did you do: Ex.—Ran a lathe, Sold shoes, Drove a tractor

DETAILS OF EMPLOYMENT (show most recent occupations first)

Name of Firm	Address	Character of Duties	Dates Employed From	Dates Employed To	Weekly Wages

Signature of Examiner:

Preliminary Assignment: 1. 2 3. Date:

Final Assignment to Course: Date:

Transferred to Course: Reason: Date:

WEEKLY MARKS

Week	Mechanical Ability	Speed	Resourcefulness	Personal Qualities	Days Absent	Work Completed	Remarks
Examination							
Gen. Average							

General Rating:—5-Highest; 4-High; 3-Middle; 2-Low; 1-Lowest

Final Transfer out to:— Date:— Final Rating:—Apprentice (A); Journeyman (J)

Special Remarks:— Trade:— Symbol:—

(Signed) Educational Supervisor

(Reverse side)
Registration and record blank

REGISTRATION AND CLASSIFICATION

Considerable advantage was gained by an intelligent classification of the men upon their arrival at a Training Detachment. In general men with occupational experience did their best work in the course which gave training in that occupational line. The course served to build upon this experience and broaden the sphere of usefulness of this group of men. The courses for the telephone electrician and machinist, demanded a higher type of general intelligence and capacity because of their broad technical content than did the courses for the cobbler and telegrapher. In addition to these factors the personal choice of the men had to be given some consideration. Where only one course was offered little difficulty was experienced. Where a variety of courses were conducted attention was required to effect the proper assignment of the men. A study was made of the problem and the best features of the methods in practice were embodied into a composite and sent to all the Training Detachments as a suggestion of a practical method and for the purpose of standardizing the procedure.

The following is a copy of the instruction circular sent out:

CcA-40

EDUCATIONAL INSTRUCTIONS.

SUBJECT: STANDARD METHOD FOR THE REGISTRATION AND CLASSIFICATION OF MEN IN THE VOCATIONAL SCHOOLS.

The following suggestions for registration and classification of the men that reported for vocational training were prepared after consideration of the methods in use in a large number of institutions. These suggestions represent the best practice that obtains in the various schools.

INSTRUCTIONS FOR THE REGISTRATION AND CLASSIFICATION OF MEN IN THE VOCATIONAL SECTIONS

1. The men upon arrival should be given an outline showing the content of each course offered by the Institution, as well as the qualifications required to enter each.
2. The registration should be carried on in a large room, which is provided with tables and chairs, so arranged that each candidate for registration faces the examiner. One part of the room should be set aside for registration, and the other part for trade testing. Extra chairs should also be available for men waiting to be classified.
3. The men report first to the registration table, where the examiner asks such questions as will place the candidate at ease, while giving the information necessary to fill out the Registration Blank (Form E. S. T. 21). The Registration Blank should be filled out by the examiner who should draw out the necessary information by careful questioning. The examiner before deciding upon the preliminary assignment of a man to any given course should

take into consideration the candidate's experience, education, natural ability, choice, needs of the Army, and the contract the Institution has as to numbers for the several courses. He should indicate under "Preliminary Assignment" three possible courses which the candidate is fitted to pursue advantageously to the Army. In the majority of cases it is best to build upon the experience of a man and not to attempt to train him for a new line of work, though results with the latter have on the whole been surprisingly successful.

4. After the Registration Blank has been filled out, the men report one at a time with the Registration Blank at a table marked with the course of their first choice, as indicated upon their Registration Blank. At these tables are seated the instructors who are responsible for the various courses, who trade test each candidate. These tables should be provided with such equipment as will aid in practical tests. As an illustration, a table for trade testing electricians should be provided with various types of switches, different kinds of conduit fittings, etc. A table testing automobile mechanics should have several different carburetors, magnetos, spark coils, etc. If possible two men should examine each candidate for admission to any course. The preliminary assignment should be checked by the trade tester who makes the final assignment to course. A simple practical test to check each man's ability should always be given. Some institutions use psychological and other special tests to determine the mentality and general qualifications of a candidate for a certain branch of work. As an illustration, tapping speed and tapping accuracy can be used as a general guide in determining the ability of a person to learn to send telegraphic code messages. A reasoning test has been found of value in determining special fitness for topographical draftsmen.

5. When all the men are enrolled as indicated above, the registration blanks should be gone over by a committee representative of the various courses offered, and final assignments of men should be corrected to correspond as nearly as possible to the distribution as indicated in the contract. Slight modifications from the numbers for each course as given in the contract will be allowed upon the approval of the District Educational Directors. The men having been assigned to certain courses should be carefully watched by their instructors during the first week and those wrongly placed should be transferred to such courses as will best fit their qualifications. If a transfer becomes necessary this fact should be shown on the Registration and Record Blank (EST 21), and the reason for the transfer clearly indicated. A special effort should be made to convince the man that the transfer is for his own best interests and for the best interests of the army.

6. The Registration and Record Blank (EST 21), should show at a glance what has been the man's experience, what training he has received, what has been his record during such training and his final rating in accordance with army needs.

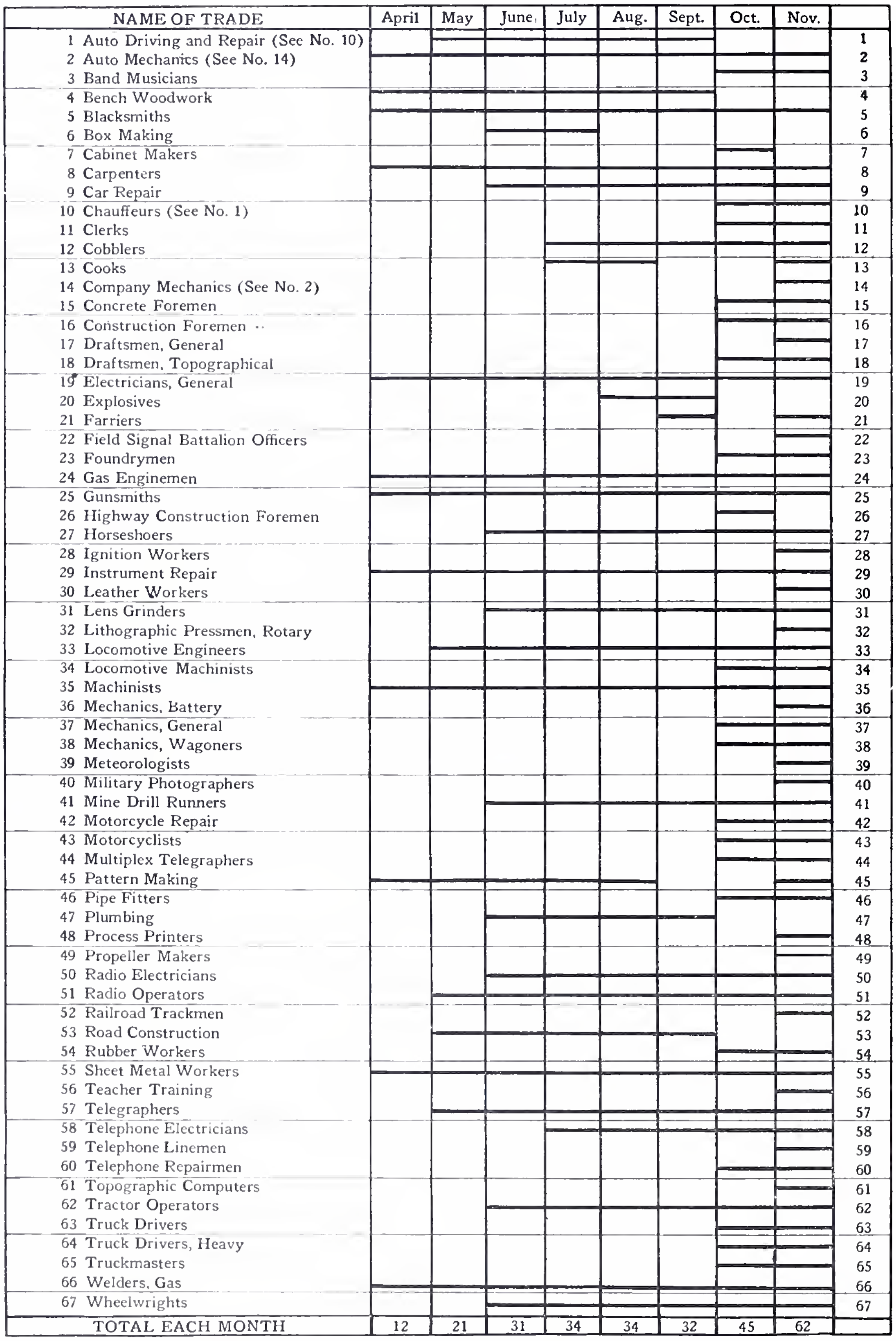
MEETING ARMY NEEDS

The needs of the service often require new combinations of parts of the standard trades of civil life. For example, a machinist on a mobile repair shop of the Ordnance Department must be able to do gas welding and to maintain the electrical generator and motors in good repair. Further, the degree of skill must agree with army requirements. For example, carpenters are required in large numbers to build barracks, dugouts, bridges, barges, etc., but only very few are needed to do interior finishing or cabinet work.

The efficiency of the army required that each place be filled by its best man, but not necessarily that each man be assigned his best place.

With the development of the various Army Corps their requirements for enlisted specialists became more specific. In order to meet more definitely the specific needs of each corps, a sub-committee on Army Needs was appointed, consisting of one military and one civilian member of the staff of the Committee on Education and Special Training. This sub-committee functioned closely with the committee's personnel officer, whose duty it was to arrange the transfer of men who had completed their training as directed by the Operations Division of the General Staff; and in addition each of the various corps was asked to appoint a liaison officer who would confer with the sub-committee on Army Needs and furnish them with information and specifications as to the numbers and types of men required and the dates on which they would be needed. By the middle of August the sub-committee had accumulated fairly accurate notes on the requirements of the corps, including the Motor Transport Service, which was shortly afterwards organized as a separate corps, and these figures formed the basis for making contracts for the winter work.

About September 1, the sub-committee was divided. Major Sherman Peer, the military member, continued to function with the personnel officer and to receive increasingly definite figures from the corps on their respective needs. The civilian member, Mr. Norman Collyer, headed an inspecting committee representing various corps which visited 29 of the committee's schools and 12 corps widely scattered throughout the United States. An effort was made to visit at least one university, one trade school, and one corps school in each part of the country for the purpose of interpreting directly to the teaching staffs of the training detachments the exact requirements of the army as to the abilities and special qualities necessary to the various types of specialists for the successful performance of their duties in the service.



Trades in which vocational instruction was given

The personnel of the inspecting committee was as follows:

Lieutenant Colonel Abney Payne,
Director of Instruction, Coast Artillery School, Fort Monroe, Virginia.

Lieutenant Colonel J. C. McLanahan,
Educational Liaison Officer, between Chief of Field Artillery and Committee on Education and Special Training.

Major Louis T. Grant,
Secretary Engineer Training School, Camp A. A. Humphreys, Virginia, and Educational Liaison Officer between Chief of Engineers and Committee on Education and Special Training.

Lieutenant Roy C. McDowell,
Mechanical Instruction Branch, Training Section, Division of Military Aeronautics.

Mr. Norman Collyer,
Representing Committee on Education and Special Training.

The District Educational Directors usually accompanied the inspecting committee over their districts, and other members of the committee's staff were occasionally able to be present during inspections.

While this inspection committee was on tour, the sub-committee on Army needs and the various course experts continued their study of the character of training required, the Educational Liaison Officer in each corps acting as the medium of introduction to the corps specialists having expert knowledge of the type of work to be performed. By this means the content of each course was carefully shaped to meet the requirements of the Army; for it has been the committee's aim throughout to train men for particular Army jobs, and not merely for the sake of giving them training. In furtherance of this policy a conference was held at the Field Artillery Schools, Camp Knox, West Point, Kentucky, on November 7 and 8, by invitation of the Field Artillery officers, at which some forty-two members of the committee's staff, District Educational Directors, and representatives of schools were present; and had the war continued, it was planned to organize a series of such demonstration-conferences in different camps throughout the country, where opportunities were presented to the district directors and the educational supervisors and instructors of our schools for first hand observation and study of the exact nature of the work the various army technicians were called upon to perform.

This experiment offers a valuable lesson to vocational and other schools serving the industries of any particular territory. In most cases such schools lack positive information on the needs of the industries into which their product goes while on the other hand the industries themselves are inclined to criticise the schools for being impracticable. If each important industry in a given district would appoint a liaison officer to study the educational requirements of his own business and function with the school authorities, it is certain that a better understanding between the two would follow, which would be reflected in an improvement, not only in the content of courses, but

Quick work with a hot rivet. University of Michigan Training Detachment.

They are surprized to find how easily brazing is done. University of Michigan Training Detachment.

in their presentation and aim and finally result in a more intelligent employee and better citizen.

The following expressions from some of the representatives of the Training Detachments who attended the conference at Camp Knox and Camp Taylor are typical of the comments received of practically all.

W. N. Gladson, Dean, College of Engineering, University of Arkansas:

"I obtained a much clearer insight into the needs of the army; the kind of men we should train for them."

Albert F. Siepert, Educational Supervisor, Bradley Polytechnic Institute:

"Meetings such as the one at Camp Knox tend to produce a better feeling and clearer understanding between army and school officials. It was an inspiration to me to see the army at work, and to learn first hand the duties of various mechanics in the tasks which fall to their lot."

A. M. Wilson, Professor of Electrical Engineering, University of Cincinnati:

"I was interested to note that no civilian instructor, no matter how expert he might be in ordinary civilian telephone practice, could possibly be familiar with military conditions, unless he had military training or experience."

W. E. Freeman, Professor of Electrical Engineering, University of Kentucky:

"It was the first opportunity I have had of seeing the work of the class of men whose training I have been supervising, and I am sure I could have done a much better job had the work continued."

A. C. Lanier, Director Signal Training Corps, University of Missouri:

"Information secured there in conference with the officers doing the work for which we were training men, gave us a knowledge of the needs of the service and spirit with which men should be prepared for the service, that would not have been gotten in any other way."

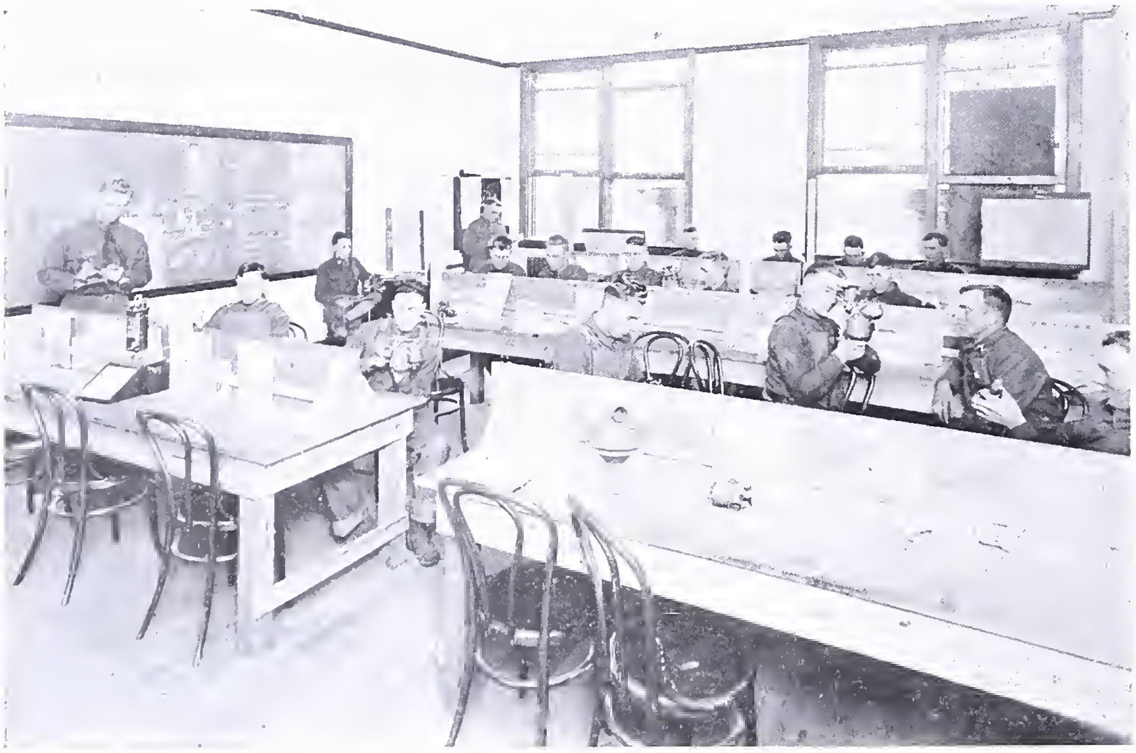
W. R. Woolrich, Assistant Professor Mechanical Engineering, University of Tennessee:

"The Camp Taylor conference clarified the whole atmosphere. It removed the haze of misinformation and what we must frankly admit was ignorance of just what the army needed. Not that I believe any of us can now say we know fully what is required, yet I must say that personally I feel so much better equipped that my only regret is that the inspection trip came after the 'main show' was over."

C. M. Jansky, University of Wisconsin:

"The conference was of great assistance to me in making my instruction material more concrete and specific. That is, I obtained first hand information in regard to the manner in which telephone lines are constructed, operated and maintained in the artillery sector at the front. I inspected the method of instruction employed and found much of interest in their method of procedure. I also collected considerable practical data, which I am working up into job sheets for telephone electricians."

The University of Nebraska Training Detachment had its course for auto mechanics organized on the unit basis. The above photograph shows a class receiving instruction on ignition apparatus.



The class is receiving instruction at the University of Nebraska on the carburetor. The job sheet before each man assigns a specific task through the performance of which knowledge is acquired of underlying principles and ability is developed to tear down, repair and properly reassemble.

METHOD OF INSTRUCTION

The army needed technicians who could do things. The soldier carpenter must be able to build the barrack, the bridge, or the pontoon when needed. The radio operator must be able to set up his instrument and receive and send messages. The horseshoer must be able to make, fit, and put on a shoe whenever called upon. It was not sufficient to teach these men to know how a job ought to be done. They had to be trained to perform skillfully the job in a limited time and under conditions which did not present a full complement of tools and materials designed for the purpose. Such ability can only be developed through supervised performance of an intelligently selected series of genuine, practical tasks similar to those arising daily in the military service. Such skill is only developed by doing and not by merely observing others. This method of training precluded any lecturing to large groups, and minimized the amount of class room instruction to be given. There was little need for the possession of notes accumulated in the lecture room or class room because conditions in France presented no opportunity for a reference to them when confronted by a job. More successful results were obtained by having the men get the informational phase of the trade simultaneously with the doing of the various jobs in the shops. Such devises as cut-away working models, charts, manufacturers' catalogs, and reference books accessible to all in the shops, were freely made use of by the men.

Best results were obtained in schools that had the courses organized into a series of jobs. In these schools the job was the unit as opposed to a period of time. A man was given a job to do and not merely assigned to a job for a scheduled period of time. In such courses as that of Auto Mechanics the entire work was divided into the major units of engine work, chassis work, carburetor work and the electrical work which included ignition, lighting and self starter. Further sub-dividing arranged the whole course into a series of what might be termed minor units. The men progressed as they developed ability in performing each successive job or unit. This method of instruction permitted a careful grouping of the men at the beginning of the course on the basis of their previous experience and capacity to progress in the course. The capable men were thus enabled to advance as rapidly as they grasped the instruction and were not retarded by the weaker men. Men with previous experience and native ability could complete the entire course in the two months' period while others found it all they could do to develope a working knowledge of the carburetor, the engine, or the chassis, or at most a combination of a few of these units. Individual instruction not only is advisable but becomes a necessary part of the method. Instructions in the

The class in radio electricity at Dartmouth College Training Detachment. The class is small enough to permit individual instruction. Each man is assigned a definite job.

South Dakota University Training Detachment in auto repairing. Manufacturers' catalogues, charts, cut away models, and used carburetors, quickly classify the mysteries surrounding this complex piece of automobile mechanism.

form of job sheets were given to the men. These assigned a specific job and contained questions which invited definite study of important features.

Performance tests as opposed to written tests were advocated, as the basis upon which to rate the men. Since the various units were in charge of different instructors and each instructor tested and rated the men upon completion of their respective units, a final composite rating was made available which was free from any personal elements and represented a fair estimate of the individual's ability and capacity in the trade.

Ideal working conditions are not always present in the field service of the army mechanics. It is more often the case of doing the best with what you have where you are. Decided success accompanied the efforts of a number of schools in the development of resourcefulness and initiative, so valuable in the make-up of a good soldier mechanic. Jobs were assigned with incomplete instructions and without the usual supply of tools and material, thus making it necessary to improvise both tools and parts to make the necessary repairs. Another method resorted to was to have the men do the same jobs in different ways. The time element was also introduced and contests were held to see who could do the jobs in the shortest time.

No definite assignments were made for evening study owing to the amount of military work to be done in addition to the vocational work, but the use of reference books during the leisure hours was at all times encouraged.

The following are extracts from the reports of several Training Detachments describing the methods of instruction in practice:

From Report of North Dakota Agricultural College Training Detachment, by E. S. Keene:

"Auto mechanics was naturally the most difficult to organize because of the number of branches into which the subject might be divided. Our method of organization was suggested by our many years of experience in teaching steam and gas tractor operation. The method of presenting the subject was of the job sheet type with brief instruction of the job given on each sheet. The method of tractor instruction is that of assembling the class once each day, when explanations of processes, descriptions of mechanism, or discussions of involved methods are gone over by the instructor. All that applies to the student body is given in the class. The classes were divided into squads, to which jobs are assigned as indicated by the sheets given each man. Aside from the descriptive sheets, considerable use was made of manufacturers' catalogs. Manufacturers have always been very much interested in tractor instruction and have been very liberal in supplying literature descriptive of the pro-products. There were no recitations at any time. The instruction was imparted in the laboratory through actual performance of the work suggested by the instructor and directions given on the job sheet. The sheets in most cases were used for reports of work performed."

Barbed wire fence becomes a telephone line in the hands of the University of Nebraska Training Detachment

Using the tools at hand during a critical time in the assembly of a multiple disc clutch. University of Nebraska Training Detachment.

From Report of West Virginia University Training Detachment, by C. R. Jones:

"There is a wide difference between the mere assignment of a job to a student without specific directions as to how he shall do the work and the assignment of a job with complete instructions as to methods and processes. There is also a wide difference in the effect of asking a student to make a piece of apparatus or a machine part from materials which may be found in the junk heap, without the aid of proper tools, and that of providing him with working drawings of the job to be done, giving him the right kind of tools for the special work involved and giving him the privilege of making requisitions on the stock room for the material best suited for the job. In the development of initiative and resourcefulness, both extremes are faulty. If the student is furnished full detailed instructions for everything that he does he is not compelled to think and becomes purely mechanical in his processes. On the other hand, if he has to work from a junk heap with nothing but hammer, cold chisel, and jack knife, he cannot develop any skill within a short time and very seldom learns to do things efficiently.

The plan that we have followed in shop courses is to give the student good tools, good material, and just enough instruction to enable him to go ahead with the work, partially think it out for himself, and at the same time secure efficient results. As the student progressed fewer and fewer written or oral instructions were given. In general, the student was made to think out an answer for himself. Often the best means of making the student answer his own question is by asking leading questions. We have a junk heap and we use it and find it very helpful, but we have never found it applicable to beginners. The first step in the process of teaching a trade is to teach the student or apprentice how to use tools and materials. The better the tools and the better the materials he has to work with, the more rapid is his progress. We have found it best to teach the student the proper method of setting up work, the use of jigs, fixtures, etc., before asking him to devise special methods of his own. When a boy has been shown how to set up a few typical jobs on a planer or drill, a job can then be assigned to him without any instructions and he may reasonably be expected to work out his own methods without losing an excessive amount of time."

From Report of University of South Dakota, by Robert L. Slagle:

"We succeeded in preparing a job sheet for each department. Each of these sheets stated the names and descriptions of the individual jobs constituting each course. Each instructor was provided with a number of cards, one for each student in the section. In separate columns were recorded the date of performance of each job, the time spent upon it and the proficiency and then was transferred to another job.

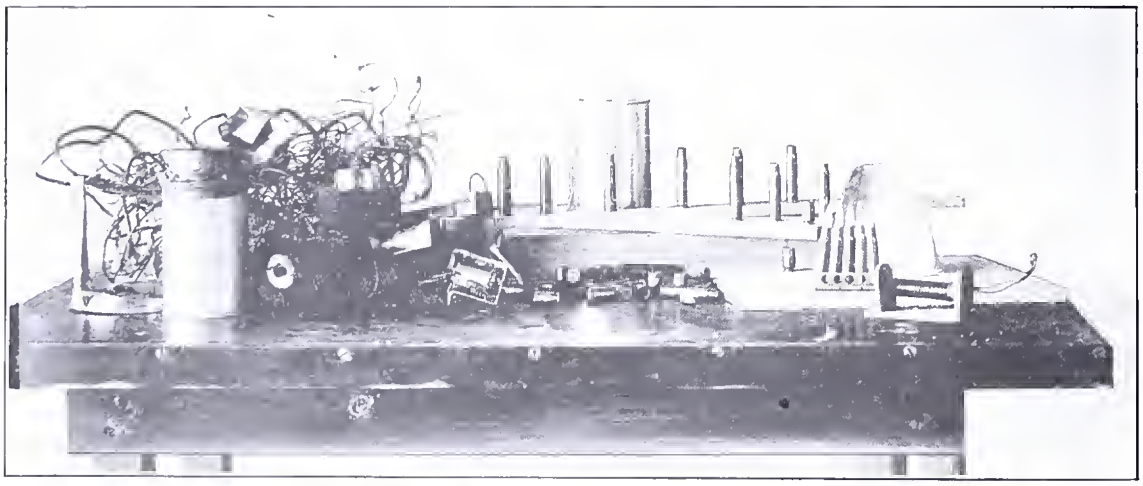
Very little lecture work was done. The men were given definite things to do. Their success in doing these things was the thing arrived at. Their intelligence was judged by the character of their performance. Some written work was required and considerable drawing was done by the carpenters and electricians. Written tests were frequent in the auto mechanics division, but not elsewhere. These men expressed themselves far more effectively through their handwork and their drawing than they could do through written language. The lecture method showed itself an utter failure with these men at the very start. The few instructors who attempted it soon dropped it, and written work also proved of very little value except in one section. Drawing proved an extremely valuable exercise with the electricians and carpenters.

The work of each student was closely supervised in most sections. In addition to the civilian instructors there were in each section some students who had had considerable experience in the work and some of these men were used freely as instructors.

The jobs assigned were very definite. The students understood the thing they were to accomplish and the jobs had such a character that their success or failure could be made very evident to them. The work of each student was carefully inspected and the feature of success and failure made clear to him."

From Report of New York University, by Dean Charles H. Snow:

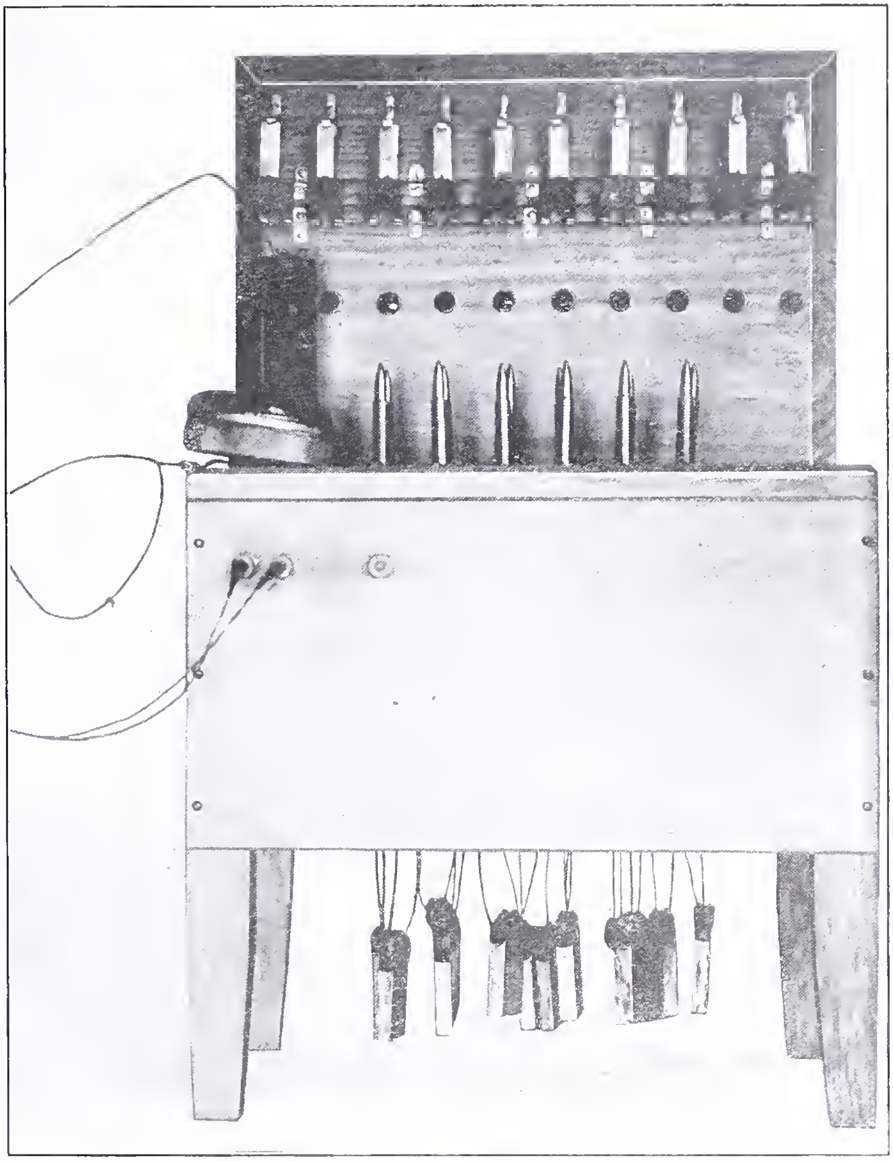
"In attempting to secure initiative and resourcefulness our lack of vocational equipment became an asset. While all fundamental tools and apparatus were collected within the shortest possible time we did not at any time attempt to go much beyond this fundamental equipment. For example, some of our student soldiers asked for a gas furnace to melt metals for bearings. They were shown a Westinghouse Locomotive Air Compressor, and a nearby gas service pipe, with the result that in a very short time a remarkably efficient blow-torch was evolved. We did everything possible to impress the men with the idea that much of their work would have to be done where special tools might not be forthcoming, and that in most cases they would be judged by results rather than by methods."



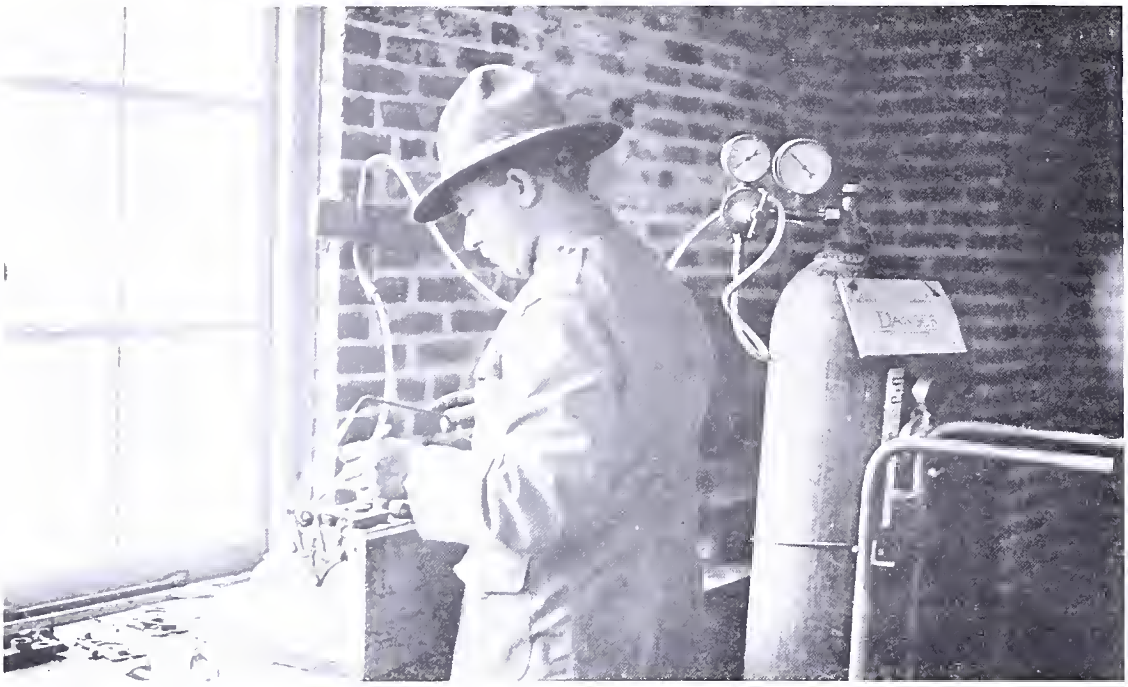
Scrap material composed of tin cans, wood, wire, and empty shells, used in the construction of improvised telephone equipment

From Report of Municipal University of Akron, by Dean Fred E. Ayer:

"In addition to the usual methods used in the military training for the development of initiative and resourcefulness, the factory instructors required the student to inspect tires which had been worn or injured through accident or carelessness and report upon the probable cause of such injury and the proper repair."



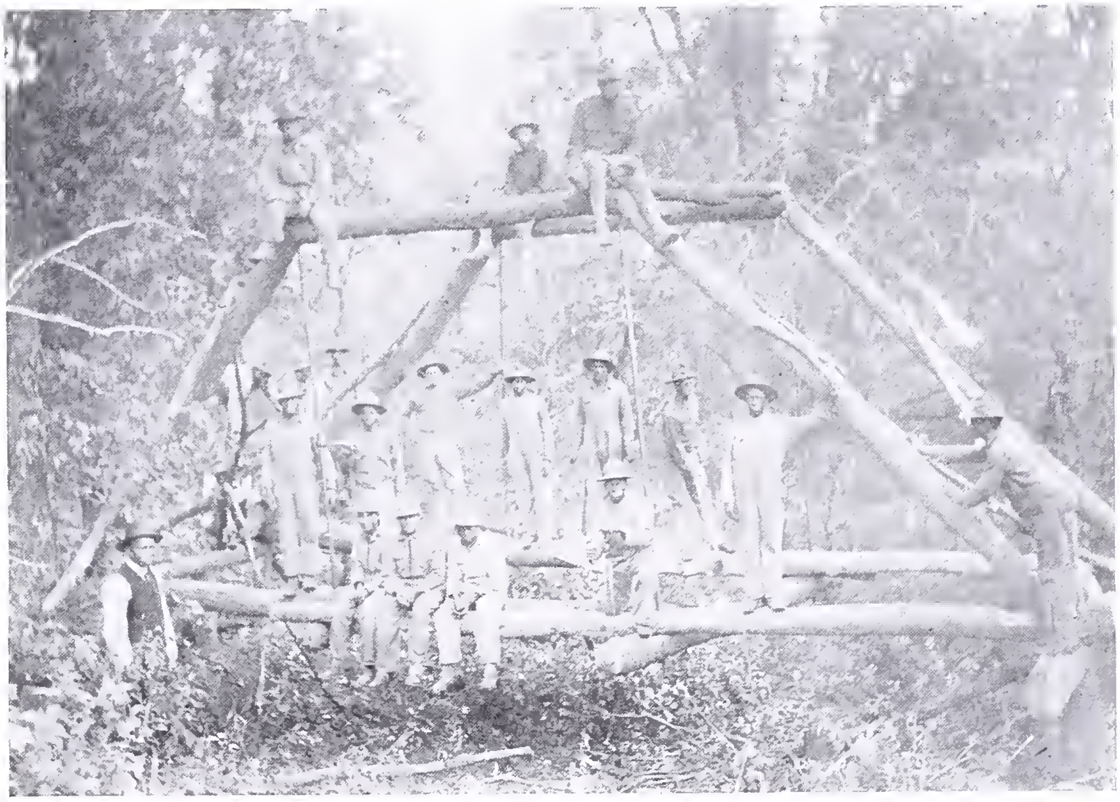
Front view of telephone switchboard constructed at Camp John Wise from scrap materials, shown on opposite page



Storage Battery Department of Los Angeles State Normal School Training Detachment. Learning lead burning by doing it.

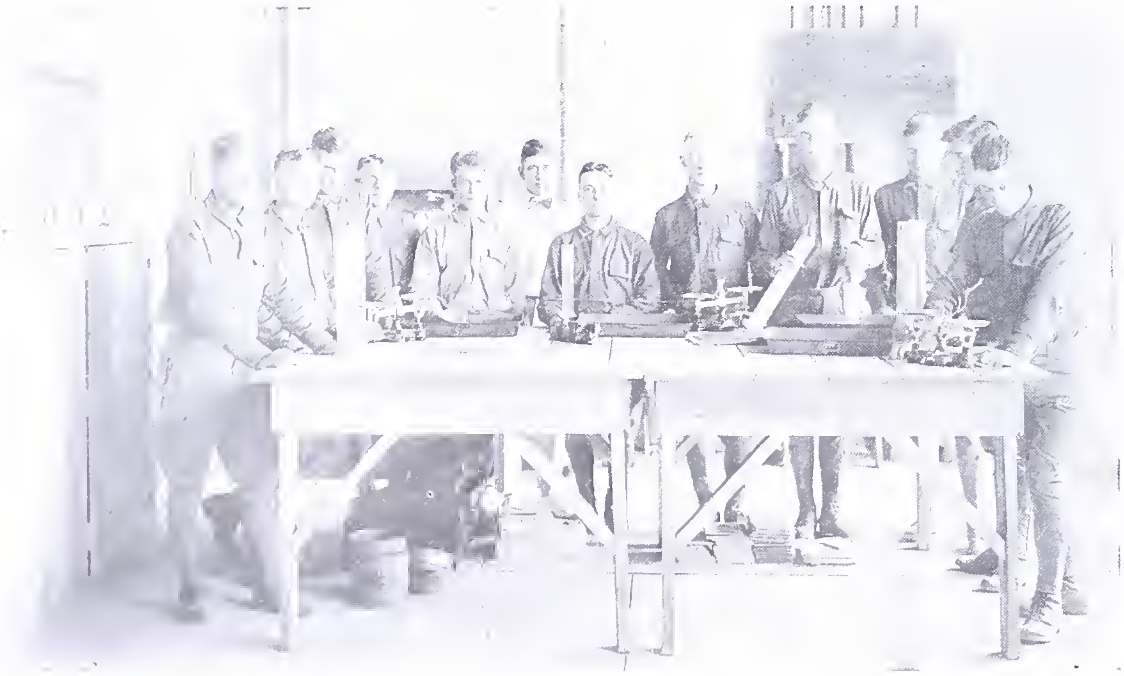
Auto Mechanics School, Indianapolis, Indiana, Chamber of Commerce Training Detachment. Repairing a magneto under supervision. Learning by doing.

Western University Training Detachment increasing their knowledge of wiring through a job of installing a permanent electric light line in the school library

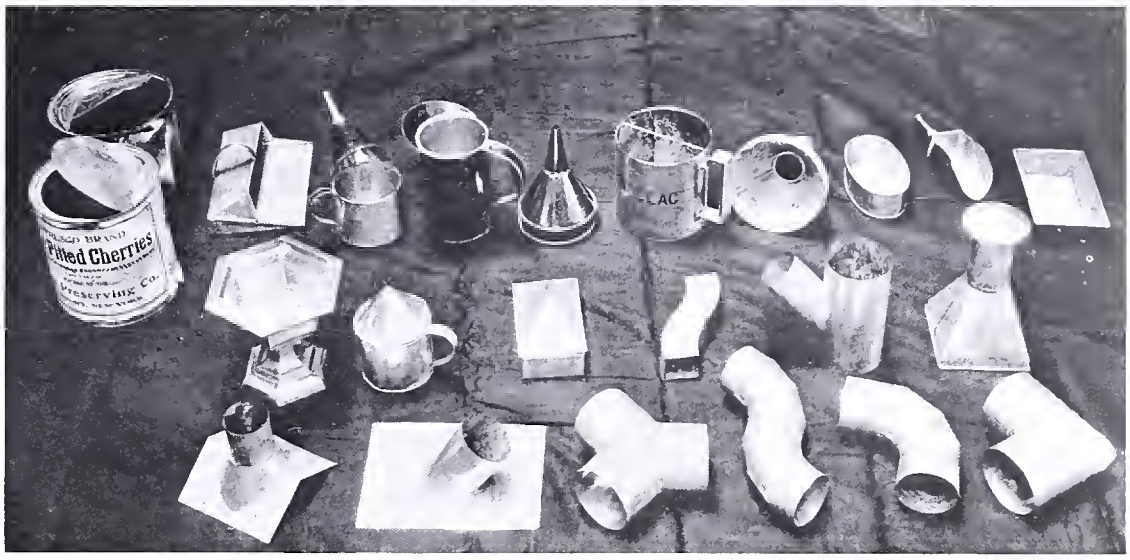


The resourcefulness of the class in carpentry at Western University when confronted by the job of building a bridge with the materials at hand is here illustrated

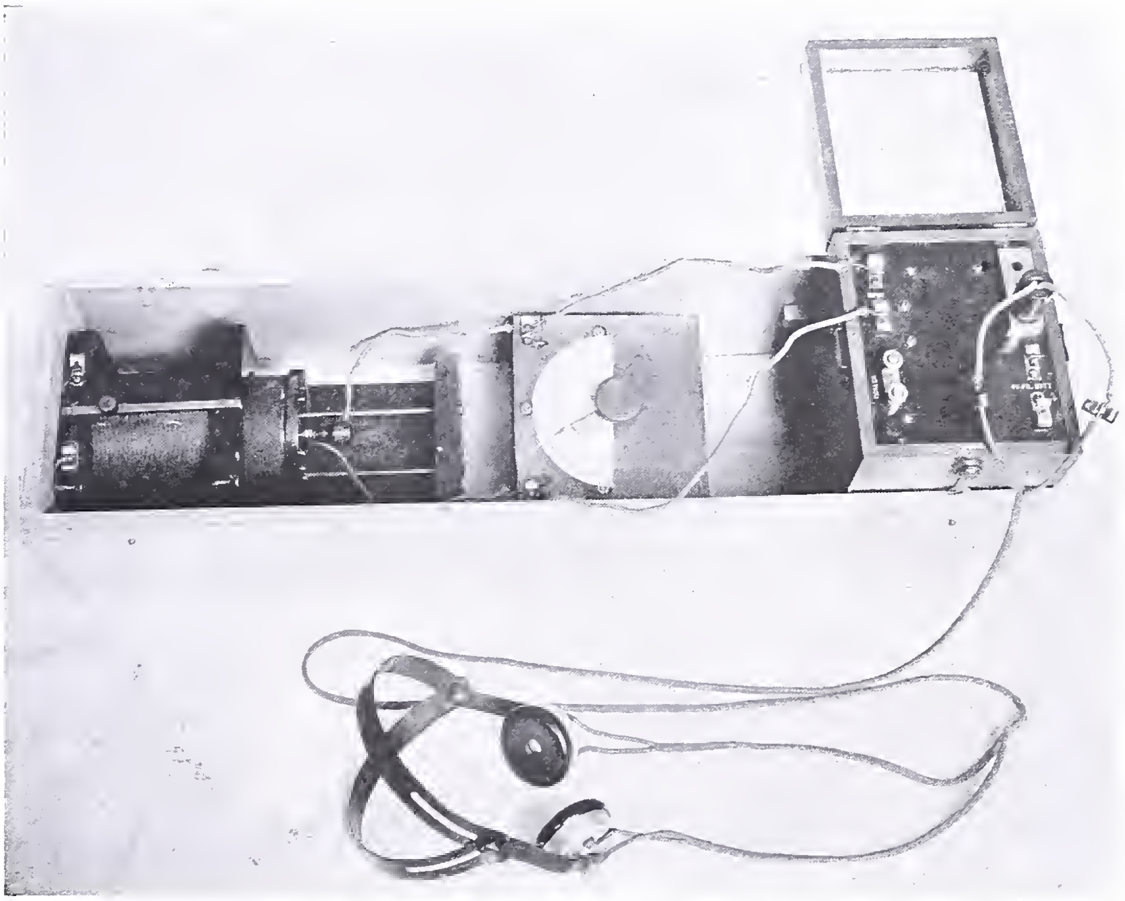
The concrete workers of the Mooseheart Training Detachment got experience in making forms as well as mixing and pouring concrete



The Mooseheart Detachment also spent time in the laboratory learning some of the chemistry and physics involved



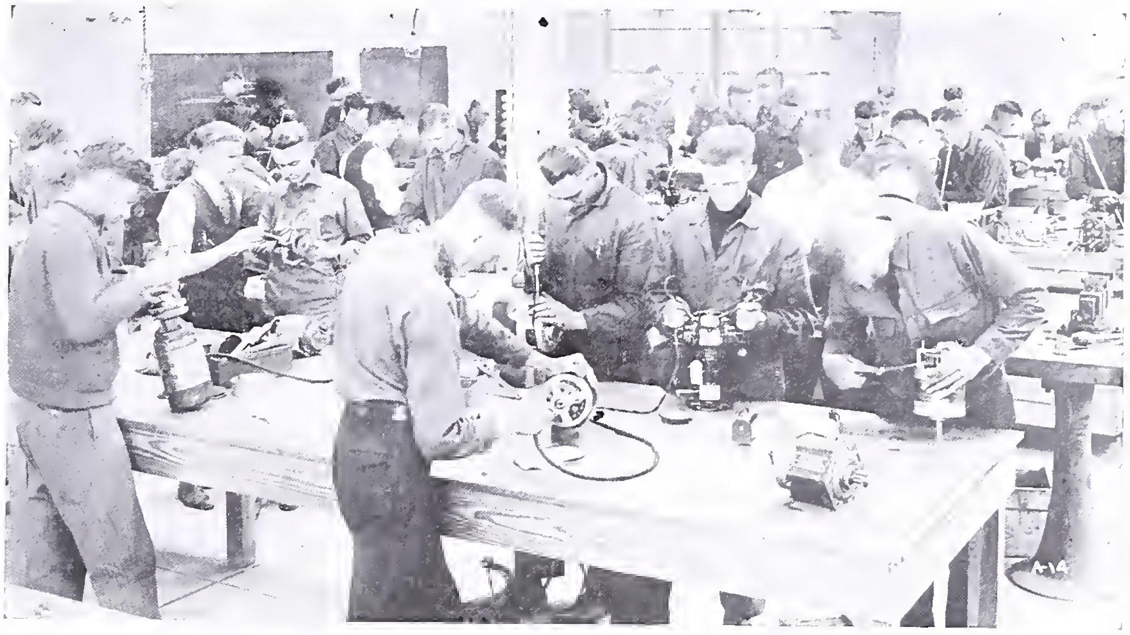
The raw material and product of sheet metal classes of the University of Wisconsin Training Detachment



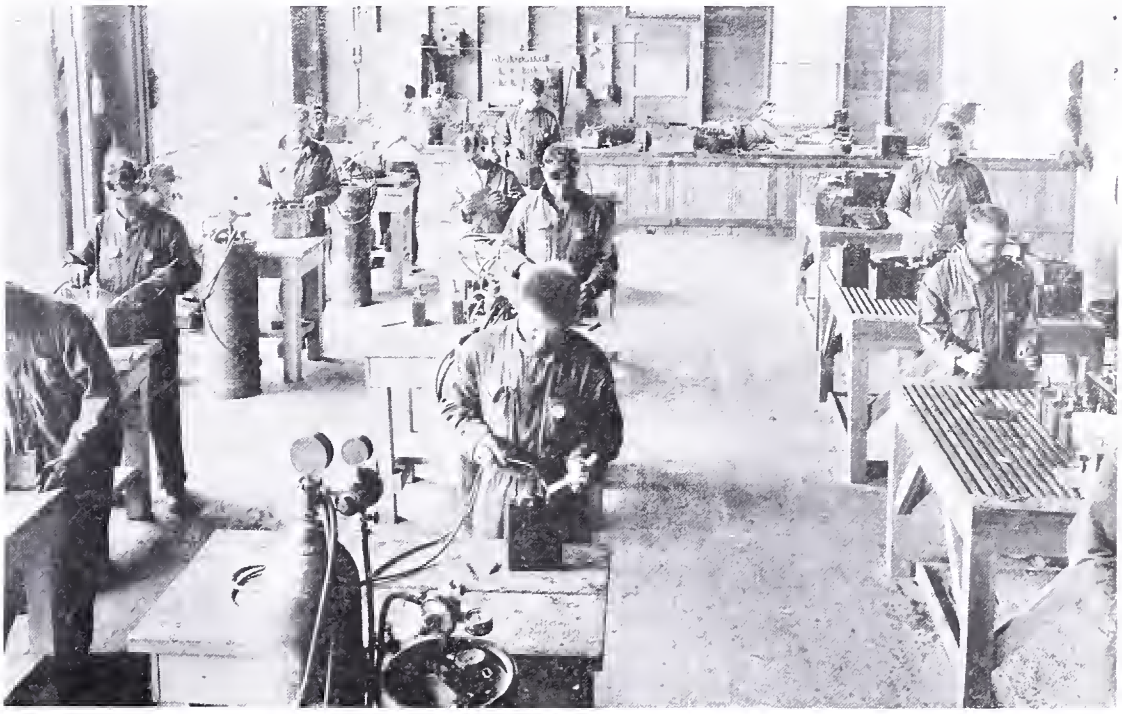
Wireless outfit made by radio electricians at University of Wisconsin Training Detachment

A class in concrete construction at University of Colorado

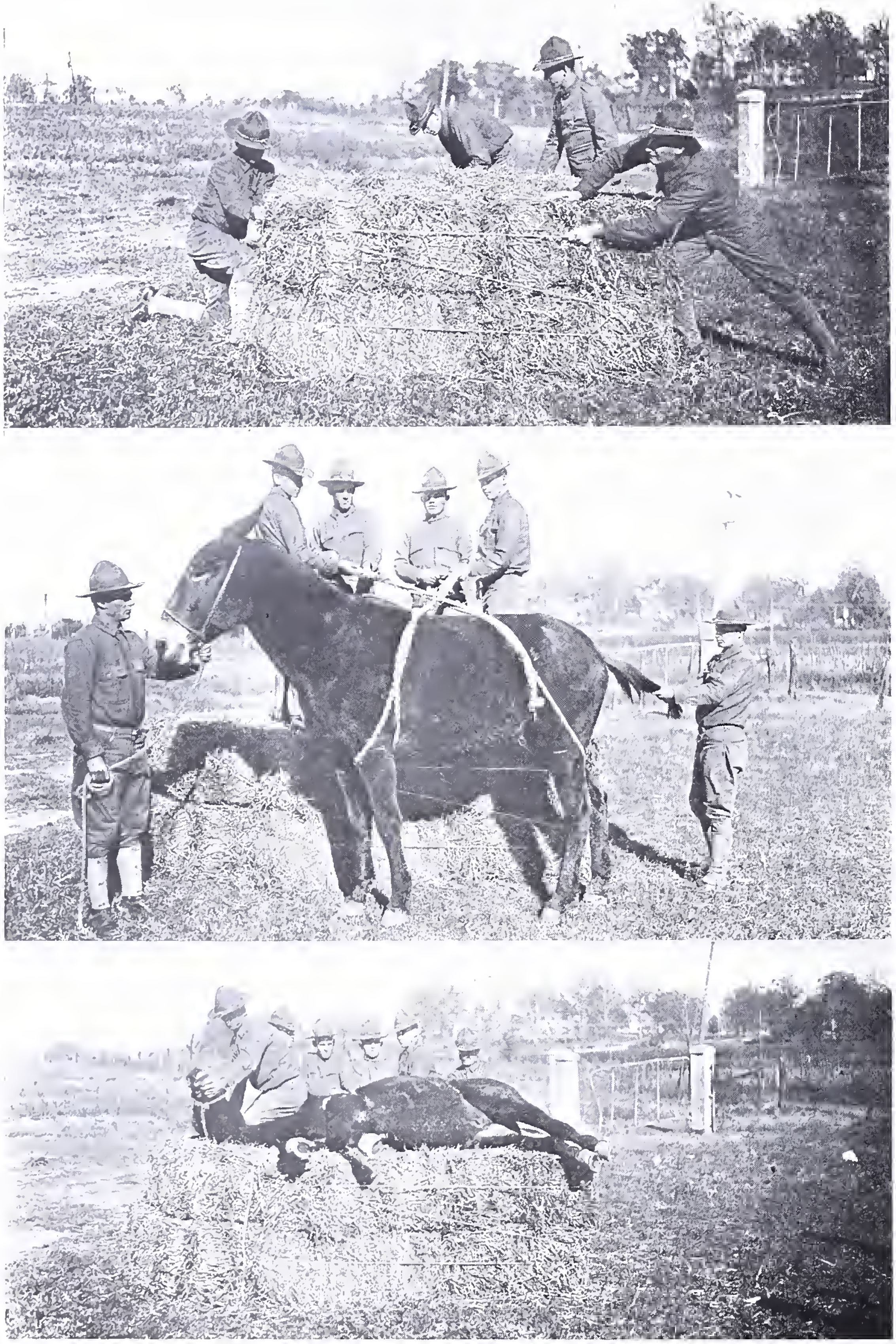
Concrete class at Oswego State Normal, laying the foundation of the barracks



Showing a class in automobile ignition apparatus repair at Michigan Agricultural College Training Detachment



Class in storage battery repair, University of Texas Training Detachment. Batteries are built as well as repaired. Every man gets an opportunity for experience in all phases of the work. The job is not finished until the battery is charged and tested



Soldiers of the Farriers Class, Mississippi Agricultural and Mechanical College Training Detachment, receiving instructions in field methods of preparing animal for surgical operation

INSTRUCTION MANUALS

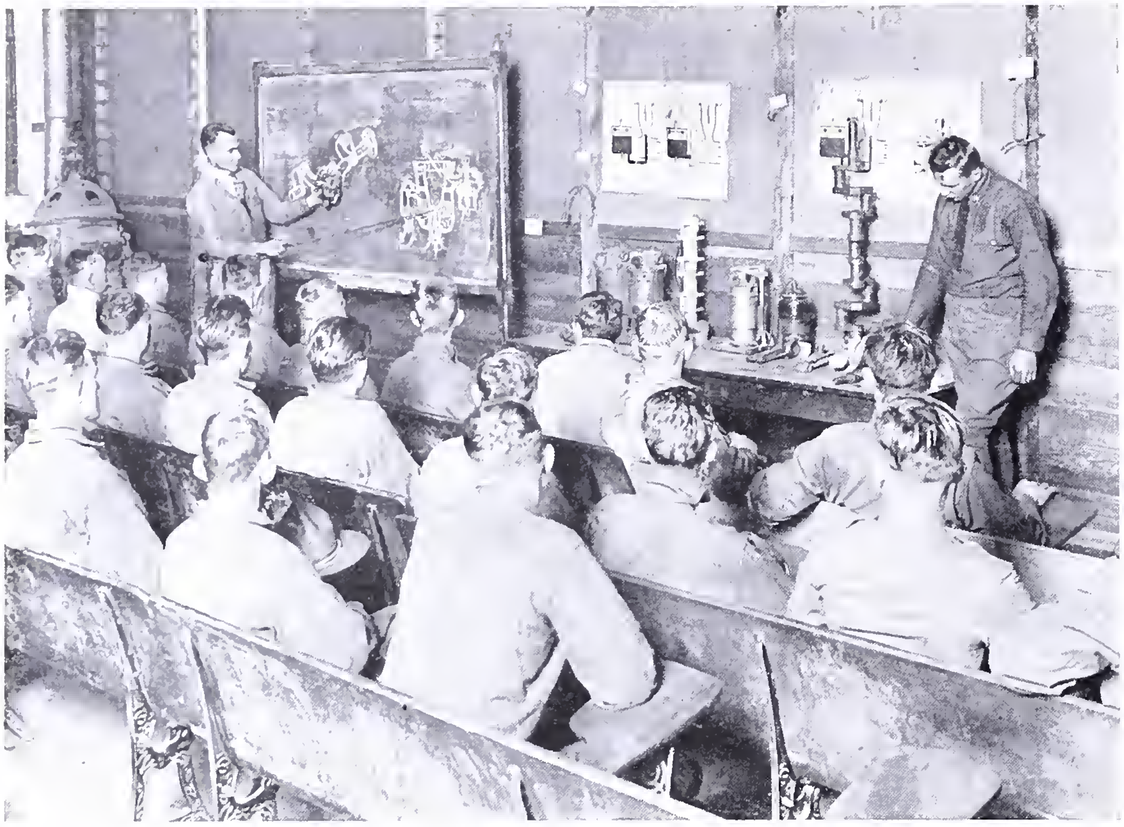
In adopting a method of instruction which consisted chiefly of training men by having them do the type of work which they were to do later in France, it was found that there were no existing course outlines or text books which assembled the trade and technical information required for army trades as they were practiced in the American Expeditionary Force. It was, therefore, necessary to gather a corps of experts and assign them to working up such text material. In the interval while they were doing this, trade courses which had been previously prepared by the Federal Board of Vocational Education were sent out. These too nearly represented civilian practice and were quickly supplemented by mimeographed statements of the duties of soldiers in each trade. At the time of the signing of the armistice there had been 7 manuals printed or in press, and 5 more upon which substantial progress had been made. The 7 printed manuals constitute an appendix to this report. They are entitled as follows:

No. 2	Auto Mechanics	By R. A. Leavell
No. 3	Sheet Metal Workers	By F. W. Boland
No. 4	Carpenters	By F. W. Boland
No. 5	Telephone Electricians	By C. M. Jansky
No. 7	Surveyors and Topographical Draftsmen	By S. L. Conner
No. 8	Machinists	By H. D. Burghardt
No. 9	Farriers	By E. M. Ranck

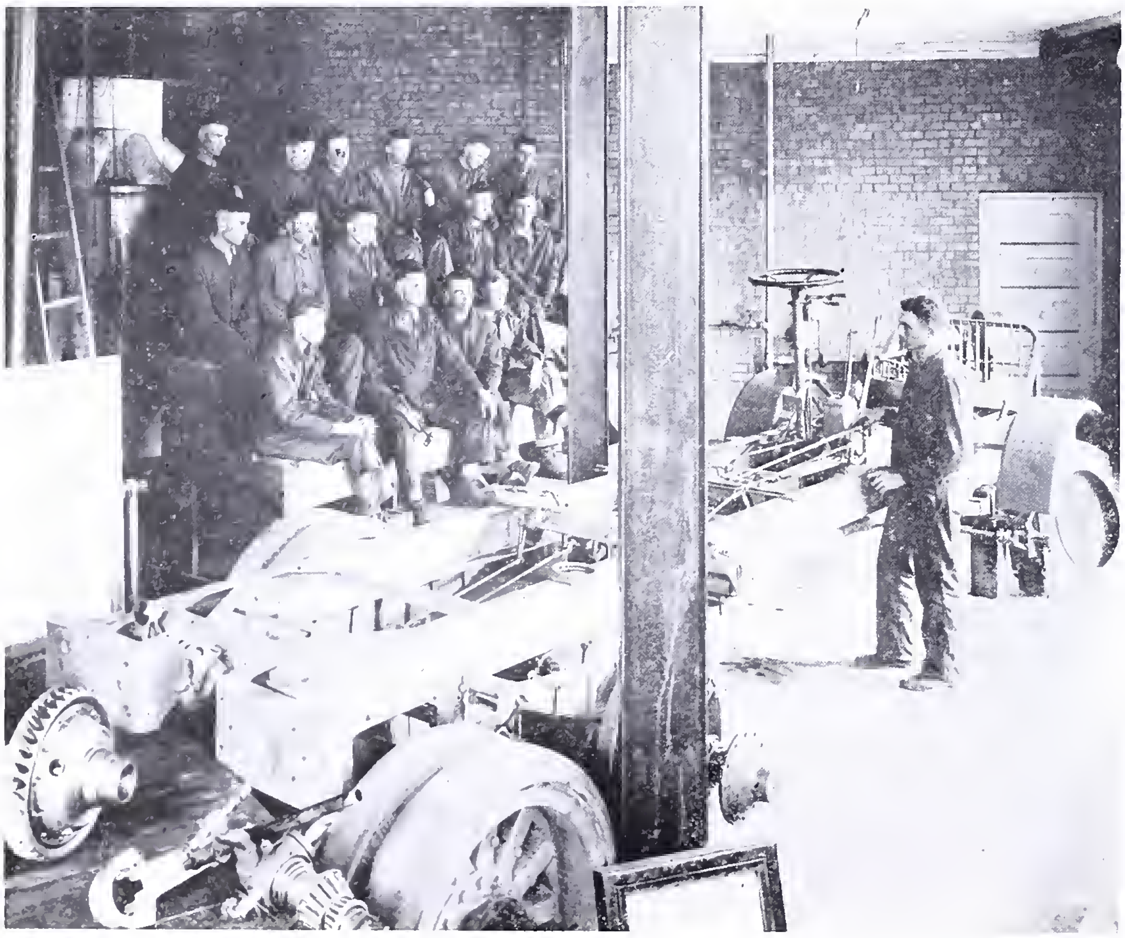
The 5 volumes in manuscript form are deposited with the other material referred to in the preface and have the following titles:

No. 6	Concrete Formen	By W. K. Hatt
No. 10	Radio Electricians	By W. R. Work
No. 12	Gunsmiths	By F. H. Evans
No. 14	Pipe Fitters	By F. H. Evans
No. 21	Electricians and Mechanics (negro schools)	By F. A. Clark

Before any work was done in the preparation of any individual manual the course experts visited representatives of the various army corps in which the particular trade was practiced and secured all the information possible as to present requirements for training in the particular line and also secured information as to organization tendencies which would eventually modify the duties of the soldiers practicing the particular trade. The course specialist also visited several cantonments and corps schools operated in the cantonments to study the methods of instruction currently practiced in the army. In general nothing was written upon the duties of each trade specialist until recently returned officers from overseas had been interviewed and all of the text material was carried out in close contact with training detachments, in



Calling together the class in auto mechanics at Atlanta University Training Detachment to clarify in the minds of the men a fundamental operating principle of the carburetor. The blackboard sketch and the cut-away model vivify the instruction.



Introducing a class at Iowa State College Training Detachment to an automobile chassis order that due consideration might be given to practical limitations of the schools giving the instruction and to the type of men under instruction. The courses were laid out so as to take under instruction both novices and semiskilled craftsmen and give each a series of jobs which would give maximum training of the required kind in the time available. This required that jobs be graded as to difficulty as well as illustrative of all operations from the simplest to the most advanced and consequently the manuals generally contained more jobs than any one soldier was expected to perform in the two months allotted.

Each of the manuals is divided into four parts, the first two are intended for the use of the instructor only.

Part 1 contains general information and a statement of the special duties of each soldier trade.

Part 2 discusses the training method recommended.

Part 3 consists of Job Sheets upon each of which is stated a job to be performed, a definite command as to what the soldier is to do and questions which would call to his attention the information which he should have to intelligently test his knowledge, familiarize him with the fundamental principles involved and tend to increase his resourcefulness in doing.

Part 4 consists of supplementary aids of a character to fill in gaps in the information available in such common sources as trade catalogues and textbooks, which it could be safely assumed would be at hand.

The manuals were printed in large type to encourage the soldiers to use them in all conditions of lighting. Tough white paper with generous margins encouraged the making of notes on the job sheets. The sheets were supplied in ample numbers to permit a sheet being given to each student. However some teachers preferred to permanently mount the sheets upon the bench or on card board mounts. As the numbers of soldiers trained in the several trades varied greatly, the first manuals completed were those for which there was the greatest demand. At the time of the armistice, manuals were printed, or ready for press, to meet the needs of 78 per cent of the winter program, and work was progressing on the balance.

PART II
THE SCHOOLS IN ACTION

THE SCHOOLS IN ACTION

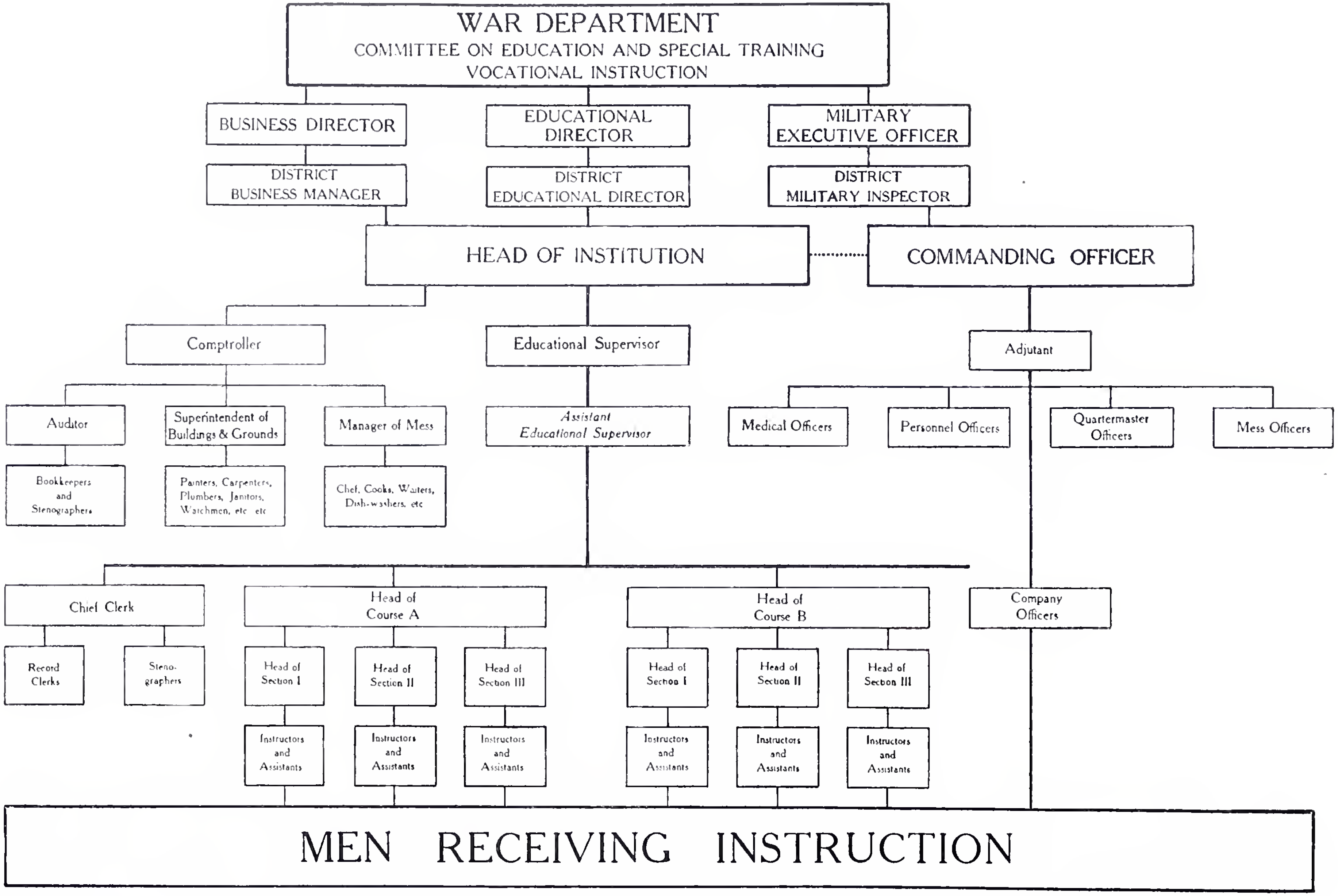
At the outset in the spring the schools took up the task of training soldier-mechanics with but the briefest of written instructions to supplement the verbal arrangements made by the district directors. The Washington office through the district directors kept before the supervisors the best available specifications for the finished product for which they would be held responsible. The detailed outlines of the courses, the selection of the equipment, the increasing of the teaching staff, in short the initiative in the great mass of detail arrangements essential to the success of the work, fell upon the schools themselves. This large measure of individual responsibility was gladly accepted and the quality of the work illustrated on the succeeding pages was made possible by the initiative and ingenuity of the schools which so promptly mastered the local difficulties during this early period.

Under date of December 11th the supervisor of each Training Detachment was asked to compile a report of the educational activities of his unit. Twenty-five headings were suggested but a free and easy running story filled with items of real human interest was requested rather than a formal catalogue of facts.

The 130 reports which have been received vary from one typed page to six bound volumes. All have been accompanied by many excellent photographs. Most of the topics suggested were well covered though some apparently did not permit of definite comment and a few were largely omitted.

The following pages present the summarized experience of the schools as set forth both in their reports and in the reports of the District Educational Directors. Obviously only the briefest historical summary can be attempted here, setting forth only the larger common experiences.

Quotations and illustrations have been chosen to represent the common experience rather than for their own special merit. Obviously many had to be omitted. Many isolated cases, not typical but none-the-less interesting, likewise had to be omitted. However, each school report has been copied in full together with its most striking photographs and filed in the several places noted in the preface. All original photographs and original copies of school reports are filed with the Historical Committee of the General Staff.


WAR DEPARTMENT
COMMITTEE ON EDUCATION AND SPECIAL TRAINING
VOCATIONAL INSTRUCTION
BUSINESS DIRECTOR
EDUCATIONAL DIRECTOR
MILITARY EXECUTIVE OFFICER
DISTRICT BUSINESS MANAGER
DISTRICT EDUCATIONAL DIRECTOR
DISTRICT MILITARY INSPECTOR
HEAD OF INSTITUTION
COMMANDING OFFICER
Comptroller
Educational Supervisor
Adjutant
Auditor
Superintendent of Buildings & Grounds
Manager of Mess
Assistant Educational Supervisor
Medical Officers
Personnel Officers
Quartermaster Officers
Mess Officers
Bookkeepers and Stenographers
Painters, Carpenters, Plumbers, Janitors, Watchmen, etc etc
Chef, Cooks, Waiters, Dish-washers, etc
Chief Clerk
Head of Course A
Head of Course B
Company Officers
Record Clerks
Steno-graphers
Head of Section I
Head of Section II
Head of Section III
Head of Section I
Head of Section II
Head of Section III
Instructors and Assistants
Instructors and Assistants
Instructors and Assistants
Instructors and Assistants
Instructors and Assistants
Instructors and Assistants
MEN RECEIVING INSTRUCTION

Standard Chart of Organization Recommended to Institutions Conducting Vocational Instruction S. A. T. C.

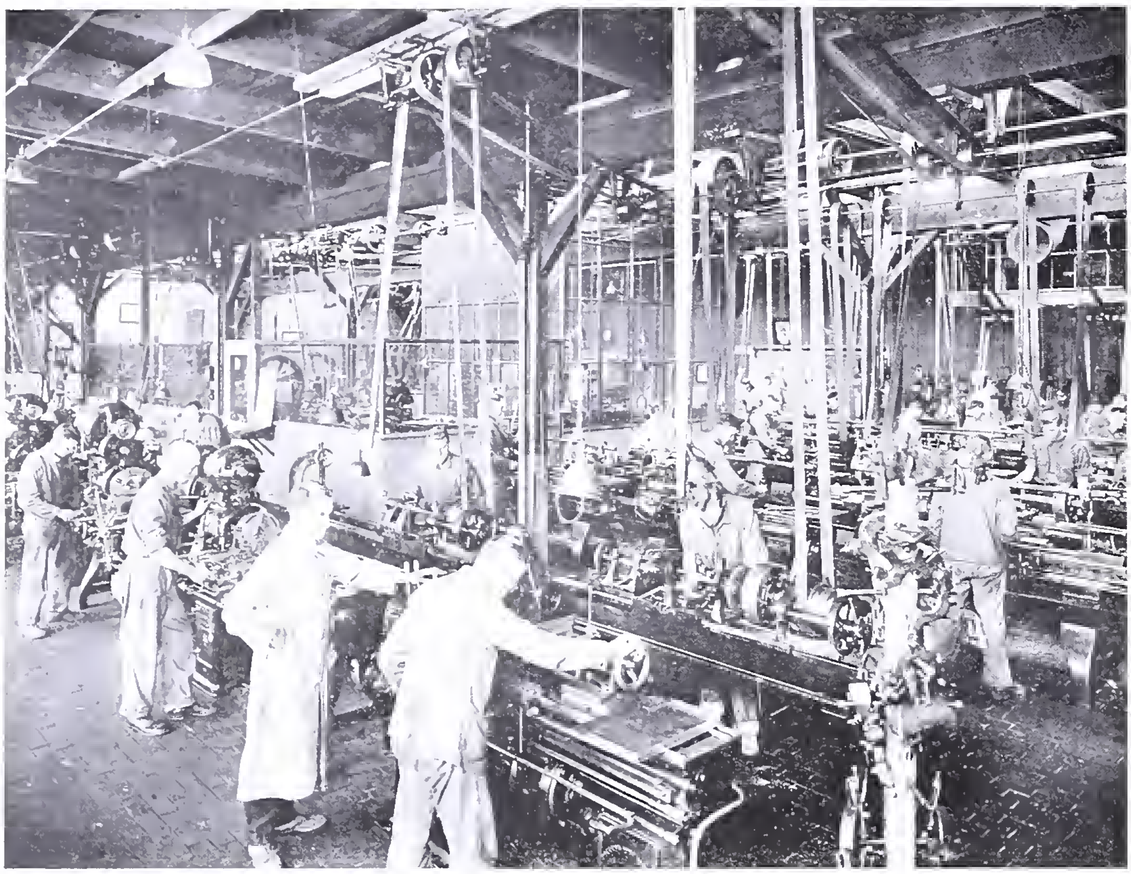
ORGANIZATION OF TRAINING DETACHMENTS

The method of administration by standing faculty committees was a handicap to the prompt and effective transaction of the business and many institutions substituted a line form of organization with capable officers in charge, who were authorized to decide questions of policy without the necessity of extending discussions in faculty meetings. Many schools committed their organizations to paper in the form of organization charts, a type of record which is in common use by military and business institutions.

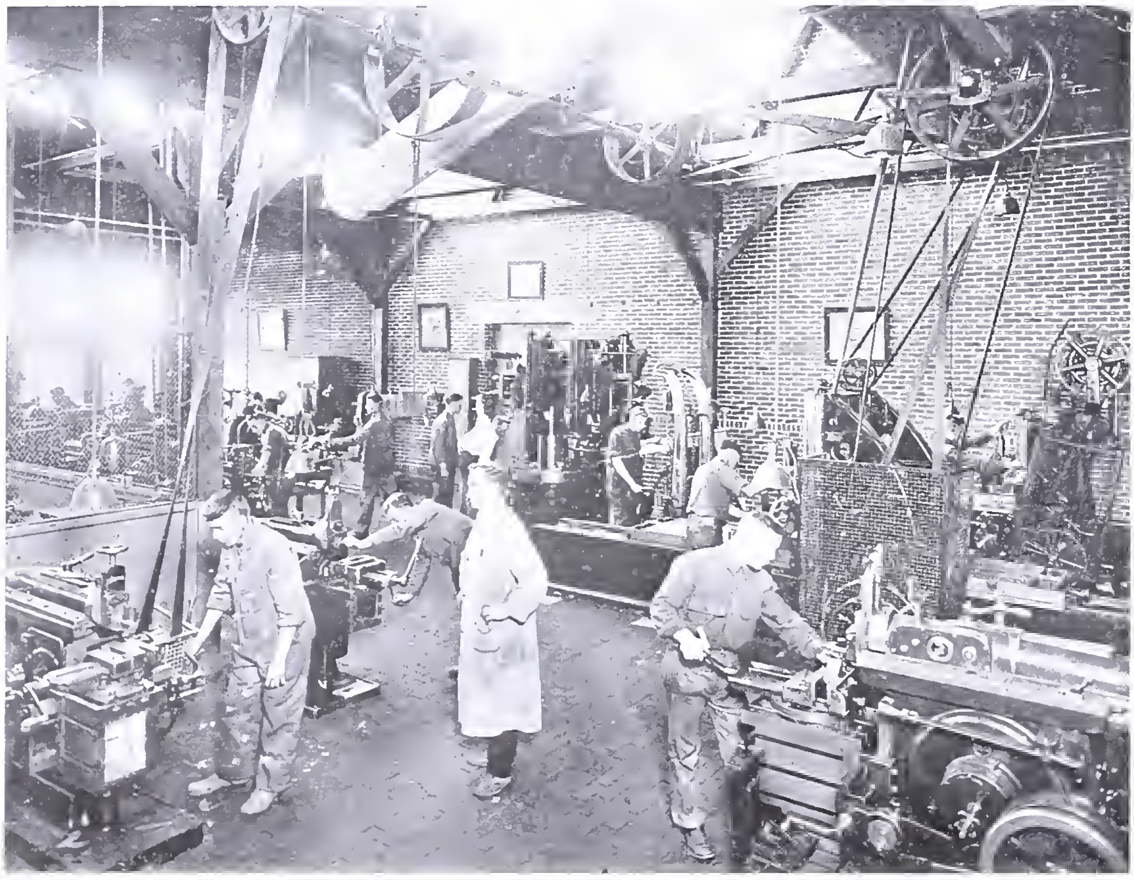
The advantages of an organization chart are a clear definition of the functions and responsibilities of each department or officer, a statement of his subordinate and superior authority, and a general picture of the organization as a whole in easily comprehensible form which will indicate their places in the general scheme. The chart of a training detachment should show the relations between the committee on education and special training, district educational director, commanding officer, head of institution, and educational supervisor; relations of business management, mess, records, housing, and military organization; relations between educational supervisor and instructors responsible for each department, together with their staffs of civilian and soldier assistants; the number of students normally assigned to each department and the manner in which they are divided and sub-divided into companies, squads and groups.

To aid the schools in developing this feature of their organization, a model form of chart was drawn and recommended, embodying the best features of many. (See opposite page).

The committee applied the same method to its own organization, and many different charts were prepared during the year, representing the committee organization at its various stages of development. The chart on page 18 is typical of the commitee organization during mid-summer before the work of the collegiate section was added.



A machine shop class at Benson Polytechnic Institute Training Detachment, illustrating the method of learning by supervised doing.



Benson Polytechnic Institute Training Detachment

SUPERVISION OF INSTRUCTION

The position of the Educational Supervisor in the Training Detachment Organization Chart deserves comment. The need for a line type of organization similar to that of the Army, Navy, and almost every business enterprise ran counter to the tradition in some of the higher educational institutions that supervision of a teacher's work is unnecessary and even humiliating, tending to impair his enthusiasm and creative faculties. On the other hand, the very nature of the situation required the closest coordination of effort. It was necessary that each member understand clearly what was required of him and that he perform his functions in harmony with the other members. This required supervision by someone giving his whole time to keeping in touch with all the many phases. Success depended upon team work and obviously the failure of any individual teacher to perform his functions in a satisfactory manner called for discipline, if necessary even to the point of discharge. The committee looked to the Educational Supervisor at each school to guide and coordinate the instruction and to insure its efficiency and progress through scheduled conferences with instructors, personal visits to classes, and informal questioning of the students. The work of the Supervisor was in turn guided by the head of the institution and the District Educational Director. It was observed that in the schools doing the best work, the supervision was carefully and intelligently maintained.

After the schools were established and classes conducted the relations of the district directors were supervisory and directive in nature. Frequent visits were made especially to the weaker schools. Considerable time was spent in the classrooms observing work in progress and also in conference with the various instructors. The constructive criticism offered in an effort to increase the educational efficiency of the schools was largely based on the following major features:

(1) Nature of the organization and its effectiveness in administering the job.

(2) Number of men per instructor in the various courses.

(3) Qualifications of the instructors in relation to their fitness to their jobs.

(4) Relative number of civilian instructors to soldier instructors and the bearing of his relation upon educational results and cost of operation.

(5) Methods of instruction and their effectiveness in accomplishing desired results.

(6) Educational aims of the various courses and their accomplishment in the development of the human abilities required by the various army corps.

(7) Extent of use of outline supplied by the Committee.

(8) Extent to which the educational content of the various courses has been organized and committed to writing for use of instructors and students.

(9) Adequacy as to quality, quantity and arrangement of the equipment, and the methods employed in the use of it for educational purposes.

(10) System of record of educational work.

(11) System of record of costs.

(12) Attitude of men in the various courses toward the work and toward the instructors.

(13) Extent of cooperation of military and educational forces.

(14) System of shop management in practice in the shop course.

(15) Comparison of shop work with commercial practice and army requirements.

(16) Relative time devoted to practical shop work and classroom work in theory, in all the courses.

(17) Daily educational program and possibilities of eliminating interferences.

The experience of the past year in the Training Detachments presents no justification for the singular sensitiveness of teachers toward the supervision of their work.

From Report of New York University, by Dean Charles H. Snow:

"We did not attempt to install orthodox vocational training school methods. We assumed that we were to prepare men for active army service as distinct from trades as followed in times of peace. For this reason and because the term of instruction was to be so short we decided to select as teachers experienced men from the trades rather than to attempt to secure teachers from vocational training schools. With conditions as they were the qualities of teachers became unusually important. We decided to engage teachers with the distinct understanding that changes in the staff might be made with the briefest possible notice. Every man was "tried out"; and, where two men appeared to be equally well qualified both were engaged tentatively, the stronger being retained. We insisted upon loyalty, vision, experience, disciplinary ability, efficiency and a reasonable degree of gentlemanliness, much in the order named. With the class in question we could not be certain before actual trial was made of teaching ability. It was thought best for the University to select the most promising material and then to itself form this material into teachers for the special need. At the commencement it was interesting to note that almost all of these employed showed a tendency to push their work, rather than to teach their students. This was shortly overcome by organizing the new instructors into a special faculty; numerous meetings and discussions were held, and before long the members of the staff thus created developed teaching ability in all respects satisfactory and in some remarkable. Team work was secured throughout."

From report of Oregon Agricultural College, by W. A. Jensen:

"The relationship between the College and the District Educational Director was very satisfactory. The college officials received many helpful suggestions from Director Shepherd who came into frequent actual contact with the work."

From report of North Dakota Agricultural College, by E. S. Keene:

"To the efficient and conscientious teacher there is no particular need for supervision but few are so good that they cannot be improved. Supervisors are not necessarily critics, they ought to be men who help by suggestion to improve the work as a whole. Locally the visits of the inspector were not looked upon with any fear of adverse criticism but as one who was in a position to rate us in general excellence. We naturally wished to make a good appearance before him. We were always glad to see an inspector and expected to receive much from him in the way of suggestion. If the inspector failed in his part we were disappointed but in any case we were kept alive to every phase of the work because of a desire to make a good standing."

From report of Polish National Alliance, by J. S. Kozacka and J. I. Harrington:

"Centralized supervision making possible the passing around of good ideas and methods developed in various institutions seems a splendid way to get results. The only regret here was that inspectors did not have time to come oftener."

Extract from the report of Syracuse University, Syracuse, N. Y., by Dean W. P. Graham:

"Every Wednesday a general Faculty Meeting was held at which all the Instructors were present. The soldier instructors and the commanding officer were invited to attend the meetings and they proved of great help in securing good team work."

From the report of New Hampshire College, Durham, New Hampshire, by C. E. Hewitt:

"The supervision of instruction in the various departments was very carefully followed from day to day by the Director of Vocational Training. Every morning at 8 o'clock the Director would meet all of the Instructors in his lecture room and plan out the work for the day and give them such information as he thought necessary to keep the Instructors at the highest notch of efficiency at all times. We feel sure that these morning conferences were of very great value in keeping the Instructors continually in close touch with the ideas of the general plan."

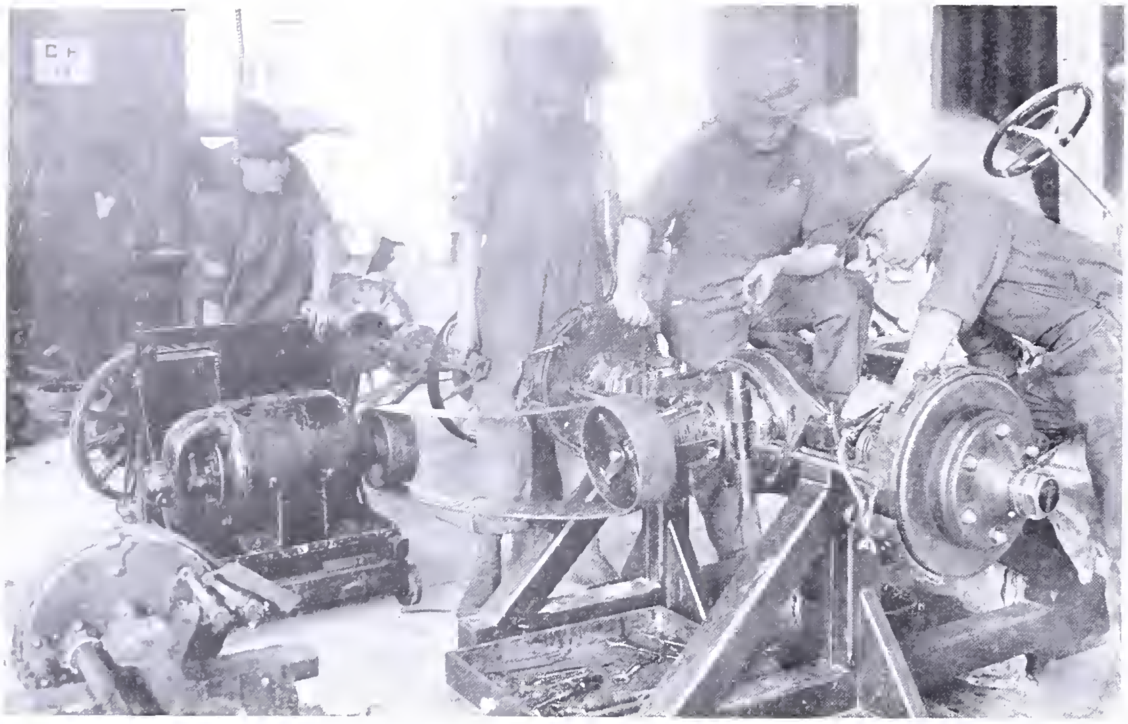
From report of Michigan Agricultural College, East Lansing, Michigan, by H. H. Higbie:

"The supervisor, recorder, and chief instructors exercised constant supervision of instruction by records and personal inspection during lecture and shop hours.

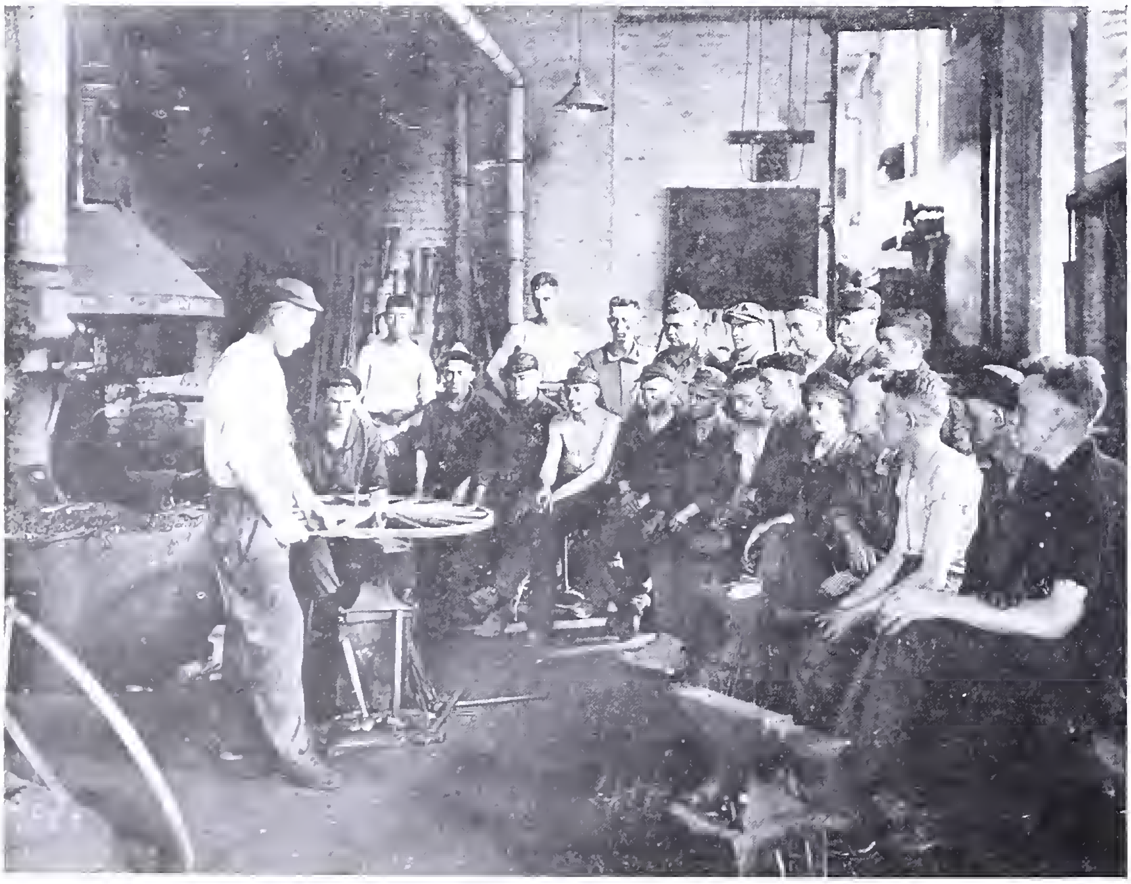
In addition:

(a) A weekly teachers' meeting was held for discussion of the problems arising in the work.

(b) Instructors' schools were conducted three days each week after 'soldier hours,' in which all instructors became pupils in each of the eight departments in turn. These meetings and schools were very successful and much appreciated by the instructors."



A squad of auto mechanics convincing the soldier instructor that the repairs to the transmission mechanism have been properly made and that the rear axle is ready to be put under the car. University of Michigan.



Blacksmith instructor at Wisconsin University

INSTRUCTORS

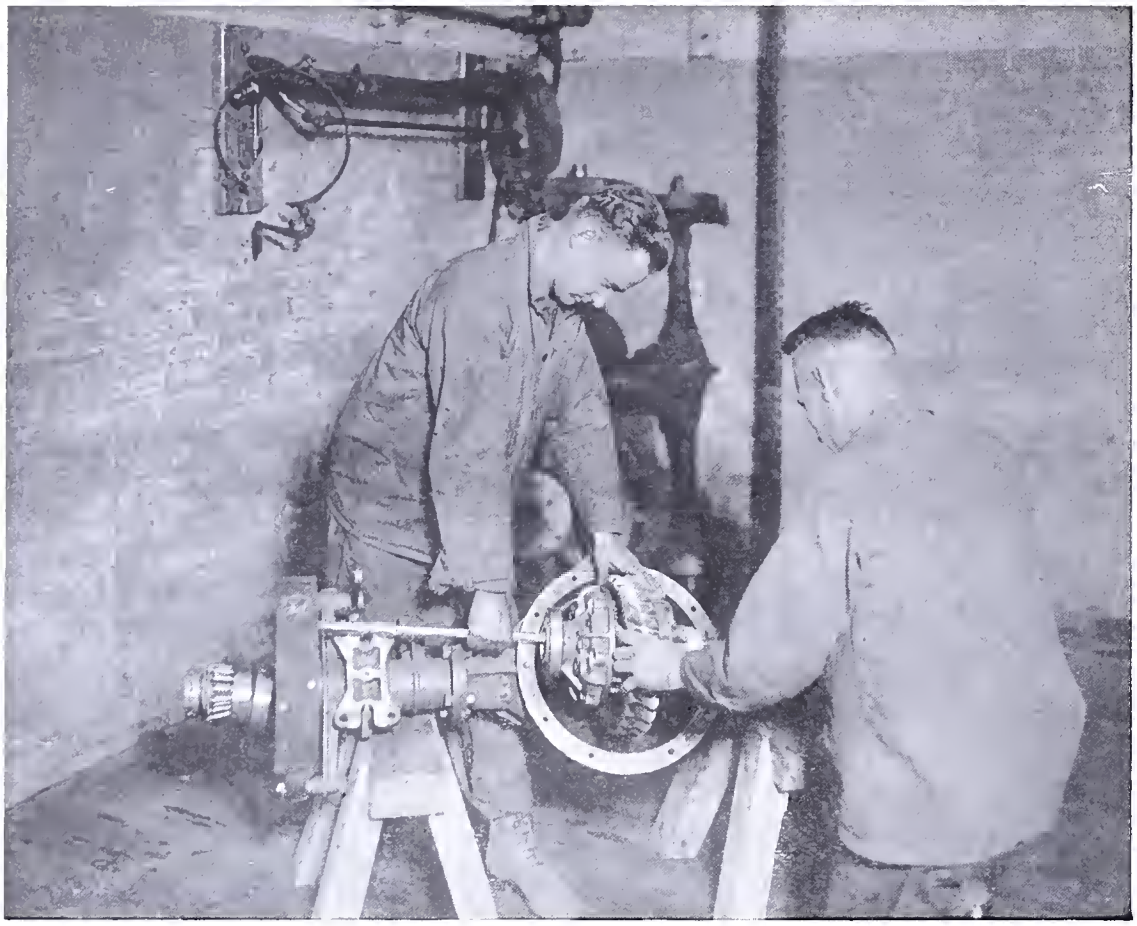
Capable vocational teachers were difficult to obtain in peace times but the task of manning the teaching staffs of the Training Detachments was made more difficult by the operation of the draft and the extraordinary demand of the munition manufacturing industries for the skilled help of all kinds. Owing to the limited development of industrial education in this country there was not a large number of trained teachers from which a selection could be made. New teachers had to be trained in large numbers. The man with broad trade knowledge whose practical experience extended over a period of not less than five years as a journeyman in the trade, and in addition a few years as foreman or superintendent, involving the handling of men, proved a very successful new teacher. The few in addition who had had a few years' experience in teaching industrial educational subjects were eminently successful. Men with little genuine trade experience were failures regardless of their years of service as teachers. In many instances skilled mechanics, with ability to express themselves were taken directly from the local industries, and, under supervision soon developed into successful instructors in the Training Detachments. Extensive trade knowledge and ability to skillfully perform the manipulative work comparable to commercial practice are prime requisites for the teacher. The experience of many schools would seem to indicate that the supervisor or head instructor must have had some teaching experience in addition to his practical experience.

Good teacher material was frequently found among the soldiers of the detachment. The policy was adapted of retaining upon completion of the course, as many of the most capable of the group as were needed to serve as assistant instructors. On the whole the experiment proved successful. In some instances the commanding officer required them to perform extra military duties which interfered with their regular teaching schedule. In other instances their eagerness to move on with their soldier companions and get into active service reduced their enthusiasm for teaching.

From Report of West Virginia University, by C. R. Jones:

"In the trade courses, all of our instructors had previous actual shop experience before becoming teachers. Most of the instructors were experienced teachers, but we had to take on a few who had either had no teaching experience or whose teaching experience had been confined to the training of apprentices. Some of those without previous teaching experience seemed to fall into the work very naturally and were successful from the start, but on the whole those without previous teaching experience who were given positions of head instructors in the courses taught were not successful organizers. In one instance, the instructor expected too much of his students, and failing to secure expected results he left the students to go their own way without much help until the trouble was discovered. With one exception, all of the instructors drawn from the shops to act as assistants or instructors under head instructors were quite successful.

A few of the soldier instructors did excellent work, notably the instructors retained for sheet metal work and for telephone work. These men were as

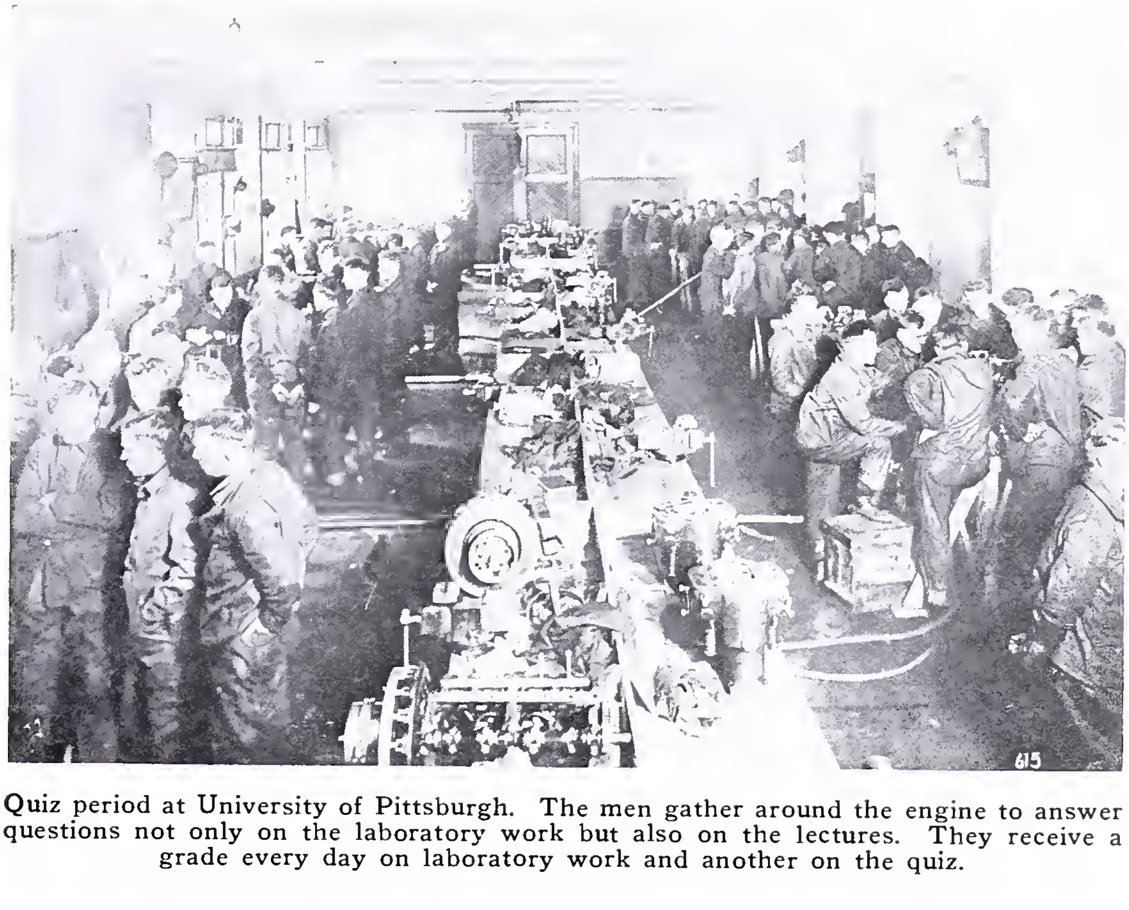


Some jobs were assigned to a team. Other jobs could be done more conveniently by a squad. Buffalo city schools at work.

University of Michigan Training Detachment valuable as any of our paid civilian instructors. With these exceptions, the work of the soldier instructors may be said to have been helpful but not dependable. Unfortunately, the regulations affecting soldier instructors were not sent to me until about the time the third detachment arrived. The military authorities considered the soldier instructors as having been assigned for the purpose of drill masters, non-commissioned officers, paper work, special details, and reserves to be sent to officers' training schools. Head instructors were not able to make definite continuous plans for the soldier instructors and could never be certain one day whether they would report for duty the next day. Their outside work made it necessary for them when they did report to come and leave with the class, and they were seldom at conferences or present during the periods when the instructors planned the assignments. Under such circumstances, they could only serve as handy men and sometimes as squad leaders. After receiving the order referred to, the military requirements were materially lessened, and had it not been for the influenza and the interruptions incident to the signing of the armistice and later demobilization, the soldier instructors would have become an important factor."

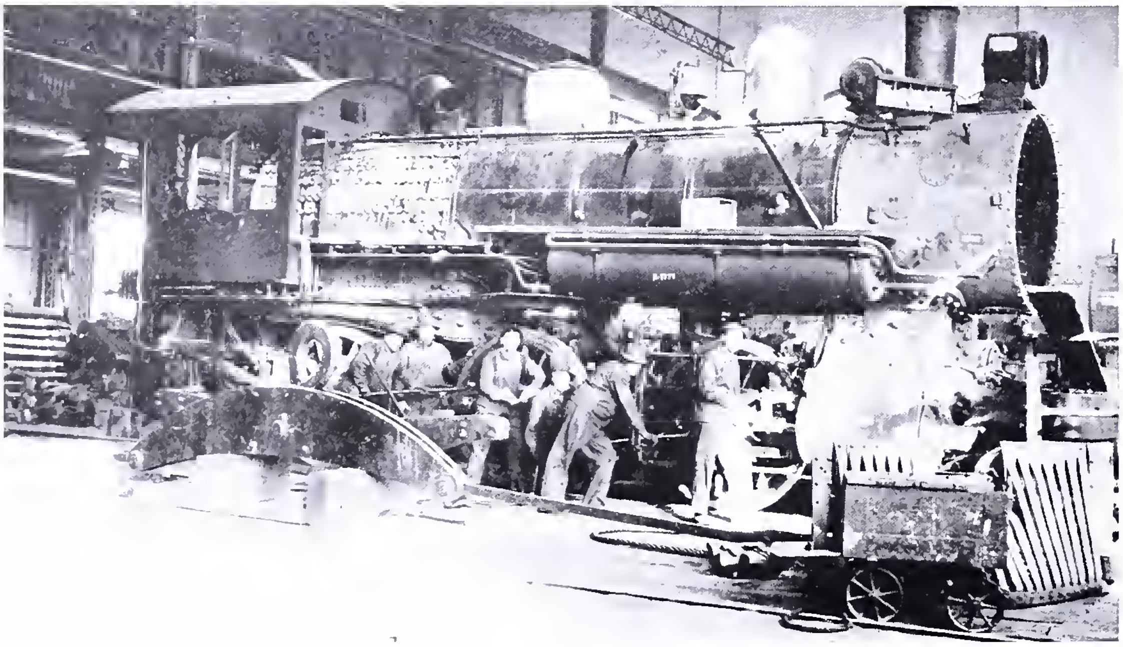
From Report of North Dakota Agricultural College, by E. S. Keene.

"The intelligent shop-trained man is the best instructor. The professional more often lacks in experience to a greater degree than the shop man lacks in ability to present his ideas. Soldiers are not usually desirable instructors, not from lack of ability, but because they will not assume responsibility and demand good work. The soldier instructor is the associate of the student, and his sympathy with the soldier is greater than his desire to keep up the standard of excellence that is desired by the institution."



Quiz period at University of Pittsburgh. The men gather around the engine to answer questions not only on the laboratory work but also on the lectures. They receive a grade every day on laboratory work and another on the quiz.

An entire class of carpenters is assigned to a phase of the construction job at Northwestern University Training Detachment



A group of locomotive repairmen at University of Nevada at work putting a connecting rod in place

NUMBER OF MEN PER INSTRUCTOR

Trade training demands a large amount of personal supervision and individual instruction. Trade courses have a relatively large manipulative content, the performance of which not only lends itself to critical supervision, but demands the skillful teacher's attention so that the correct methods are learned from the start. Courses for the auto mechanics, horseshoers, etc., require careful supervision for effective work. In the engine repair phase of the auto mechanic's course it is advisable to group the men into squads in charge of a leader with approximately five to six squads to the experienced teacher. Classes for the telegraphers and radio operators can be handled in the strictly receiving and sending phases of the course in groups as large as twenty to twenty-five to the instructor. In these latter courses the manipulation of the instrument is readily learned and further instruction assumes the nature of practice to develop speed.

Obviously an experienced instructor who knows how to organize and plan his work and has the knack of handling men can successfully teach a much larger number than one who has had no experience or who is not temperamentally fitted to be an instructor. The working equipment is a very decided factor in determining the number of students that one man can handle. One man can handle more men in a well planned shop than he can with improvised equipment. Beginners require more personal attention than advanced or experienced students, consequently one instructor can handle twice as many men who can be given jobs without being told in detail just how and what they are to do.

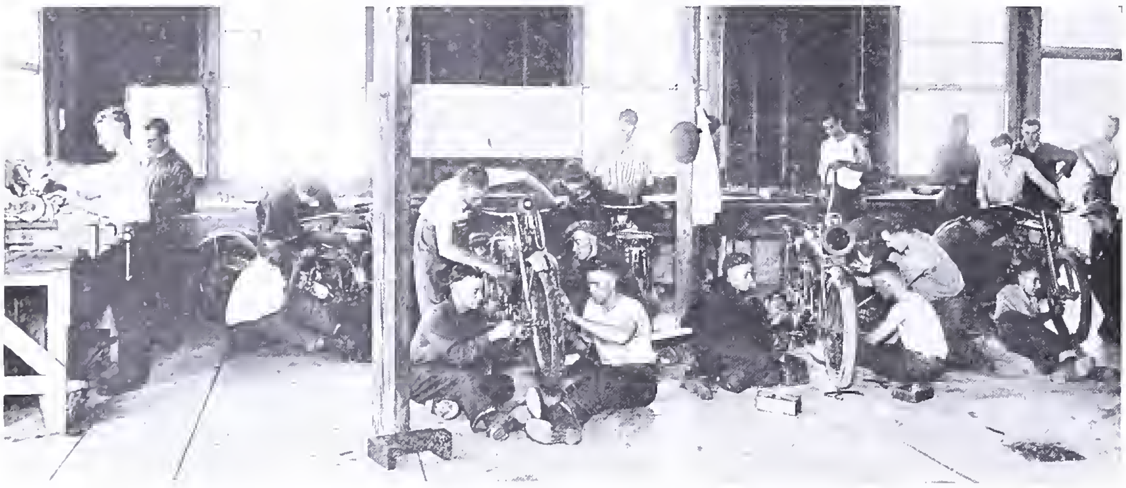
In a general way the number of students per instructor to insure thorough work should range from ten to fifteen. For automobile mechanics, the number of students per instructor should not be over twelve, while for blacksmiths, machinists, and carpenters, one man can successfully handle fifteen in a section.

A class of surveyors using transit and plane table. Georgia School of Technology.

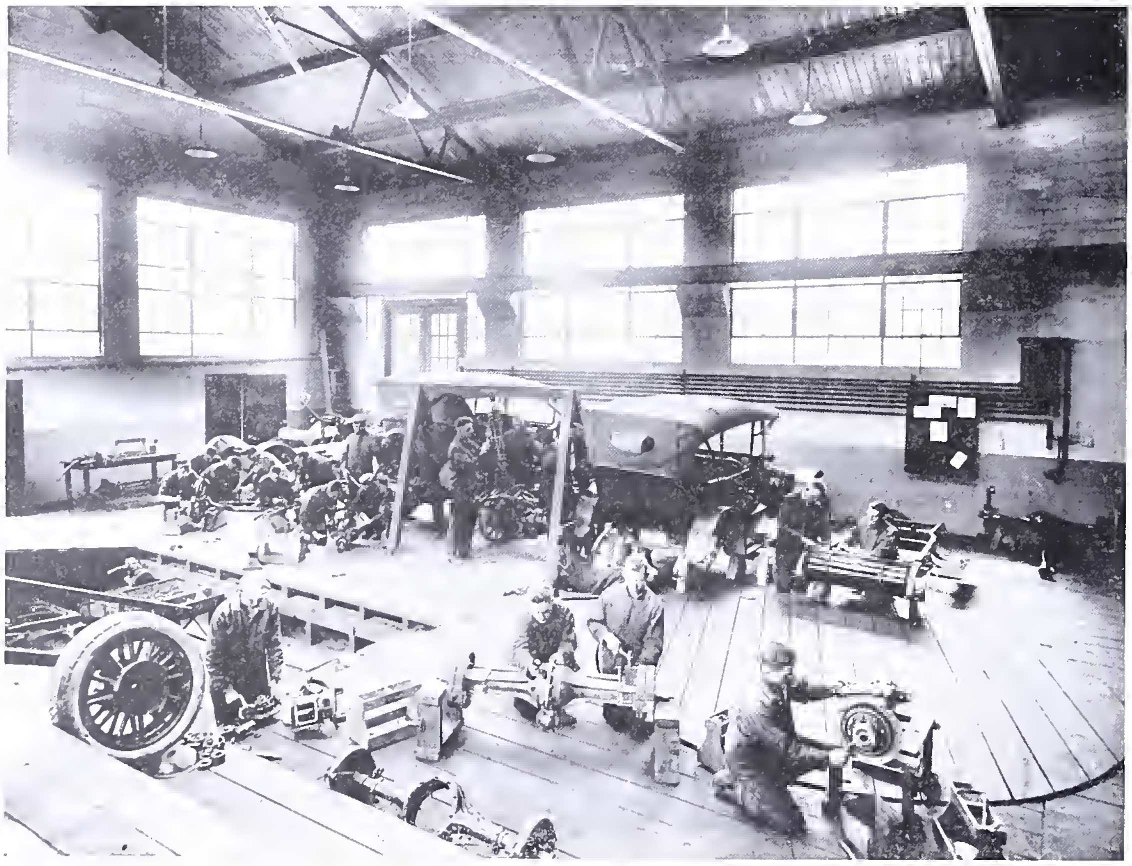
Practice in soldering and cable splicing out of doors. University of Utah.

A radio class at South Dakota Training Detachment, and the Instructors

For code instruction a large number of men may be concentrated in one room. University of Nebraska Training Detachment.



Motorcycle repairing at Missouri University Training Detachment



Chassis repairing by Oakland, Cal., Technical High School Training Detachment

EQUIPMENT

Civilian trade instruction in schools previous to 1918 was most frequently given in five common trades: woodworking, machinist, blacksmith, electrician, and drafting, although a moderate number of schools taught sheet metal, automobile repairing, molding, telegraphy, bricklaying, instrument repairing, and a few others. In most of these schools the shops were planned for single sections of twenty or twenty-five men each.

To meet the new demand not only was it necessary to expand the amount of existing equipment but the sixty odd trades urgently needed by the army demanded the equipment of entirely new kinds of shops. Further the nature of the army trades made new arrangements and combinations of equipment necessary. For example: The tinsmith was required also to do light gas welding.

In the best schools the equipment was ample and of the type to provide for individual instruction.

The scarcity and consequent difficulty in obtaining tools and materials made it necessary on frequent occasions to obtain priority order from manufacturers, and also for shipment on the railroads.

Little difficulty was experienced in finding facilities for teaching any of the branches of the wood-working trades. Many of the colleges possessed equipment for the teaching of pattern-making in connection with the work of the engineering departments. Furthermore, many of the private industrial schools and most of the first-class high schools were prepared to give instruction in wood-working. In most cases, however, their equipment was limited in quantity to the handling of classes of not more than twenty to twenty-five at a time.

The Army required carpenters with a broader range of abilities than is found in the carpenter in civil life. An army carpenter may be called upon to build a barrack-frame, or dugout, repair a railroad car, construct barges and bridges, and in fact do all kinds of work that required the use of wood as the material of construction. To train this type of carpenter in large numbers, most institutions found it necessary to purchase additional hand tools, such as hammers, hatchets, saws, squares, planes, etc. Furthermore, it became necessary to do the training out of doors at such work as constructing real, full-sized projects which involved the same kind of work they are likely to be called upon to perform in the service. When the weather prevented outside work the time was devoted to instruction in the principles underlying good design of barracks, bridge trusses, etc., nomenclature, interpreting drawings and specifications, and at practice work in the operation and care of wood-mill machinery, and at sharpening cutting tools.

For the blacksmith courses it became necessary to add to the equipment

Tractors were hard to get. University of Utah squad is taking a cruise.

Cooperation of Telephone Companies made possible the prompt supplying of equipment required for code practice and telephone repair work. The illustration shows buzzer practice at University of Arkansas.

of power driven forges some hand power forges because the latter type is in general use in the army.

Difficulty was experienced in getting new tools and equipment for the machinists' course. It was almost impossible to purchase new or even used machine tools owing to the demand put upon the market by the munition manufacturing companies. Practically all of the colleges and private schools, and many of the public high schools, that had machine shops served in the training program. While these shops are not equipped and laid out to operate on a manufacturing basis, yet good results were accomplished in training the soldier machinist. It was likewise difficult to obtain such hand tools as hammers, files, chisels, scales, micrometers, etc., necessary for the training of bench machinists.

Large quantities of old telephones and telephone parts were obtained from the local telephone repair stations for training telephone electricians. In addition the signal corps supplied standard portable telephone outfits to the Training Detachments. The use of these outfits made it possible to vitalize the instruction and give problems that were genuine and closely resembled field service situations. Notwithstanding the comparatively large number of auto mechanics required by the army and the limited number of institutions with equipment and experience in successfully training repairmen relatively little difficulty was experienced in obtaining ample equipment and capable teaching staffs to adequately meet this demand. New and second-hand automobiles, of all types, in addition to machines that had met the misfortune of a wreck or a fire, were purchased or donated and used to teach the men the construction, function of the various parts, underlying principles, and modern methods of repairing. In addition, standard trucks of the one, three and five ton type, were sent to each Training Detachment conducting an Auto Mechanic's Course for the purpose of familiarizing the men with their construction and to give some practice in driving. Local truck and pleasure car owners submitted their cars for light repair and general overhauling. Practice at repairing these cars afforded excellent opportunity to teach trouble-shooting and to test the durability of repairs made.

For such courses as locomotive engineers and repair men, cooperative arrangements were made with railroad companies for the use of this equipment for training purposes. The courses on the cooperative basis proved highly satisfactory. The equipment was of the commercial type and the experience gained thereby was genuine and practical. The working atmosphere added greatly to the effectiveness of the training. The regular workmen, without exception, took personal interest in the soldier and very materially augmented the work of the instructors and supervisors.

The following are extracts from reports of Training Detachments bearing on this phase of the work:

Truck drivers in training at Tennessee Polytechnic Institute

Lithographic transferers and pressmen of the Ohio Mechanics Institute at work

From report of West Virginia University by C. R. Jones:

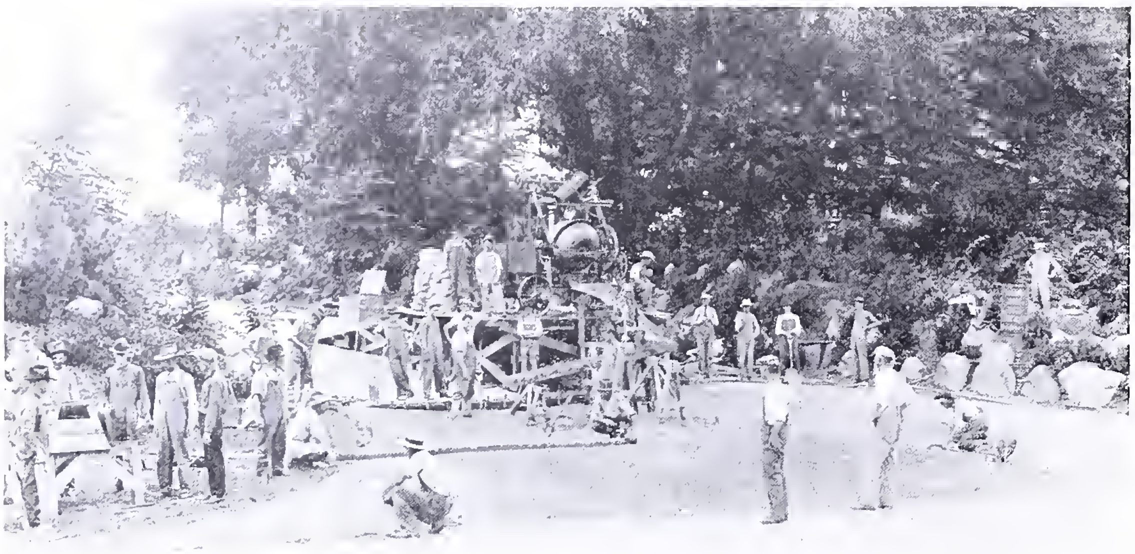
"In training men for the army, it is useless to provide equipment that would not be available in the service and practice should be confined to use of material and equipment most likely to be available. For army work, the men necessarily have to be taught to do things by hand that would ordinarily have to be done by machines. The house carpenter must necessarily work with fewer tools than the cabinet maker has at his disposal in a well equipped shop. In any case, it is important for the student to know the difference between the use of proper tools and having to do things with a few simple tools.

"In the beginning, as one example, we planned our auto repair equipment along the lines suggested in the bulletins published by the committee and purchased an automobile, several motors, various types of magnetos and other parts. The magnetos and other minor apparatus proved to be a necessity, but the many types of cars and trucks brought in for overhauling and repairs served a much better purpose than our automobile and motors. In fact, it was never found necessary or desirable to tear down the motors that we bought. In the case of motorcycle work, the supply brought in for repairs was inadequate and the machines and apparatus that we bought proved absolutely necessary in order to carry on instruction. Here again the equipment necessary for a given course of instruction varies with that available from outside sources."

From the report of Colorado Agricultural College, by President Chas. A. Lory.

"For the Training of auto mechanics—First of all, the apparatus required should consist of a good supply of small tools, especially designed to use around automobiles and trucks. One carburetor and one magneto of each of the principal types used in automobiles and trucks should be supplied for not more than two students. In working around automobiles or trucks the group should not be larger than six, and preferably not more than four at a time. This then would mean enough automobiles and trucks, or particularly parts of automobiles and trucks such as the rear axle, the transmission, the engine, etc., should be supplied to take care of the class on this basis. We found that adjustable cylinder benches proved very satisfactory in the study of the automobile engine. By the use of these adjustable benches the motors could be placed in any position desirable, thereby facilitating the easy access to all of its parts. The number of such benches would naturally depend upon the size of the class and the number of men assigned to each group. Full complements of starting and lighting systems, storage batteries, and other accessories ordinarily found on automobiles should be supplied to familiarize the students with these. The types of self-starting and ignition systems that are used by the leading automobiles and trucks should be in the laboratory for the inspection and study of the students.

For the training of horseshoers the ordinary equipment of the horseshoeing shop found in the towns and villages is required. This includes of course, the forge, the anvil, and the complement of the ordinary tools. In addition to this arrangement should be made whereby enough horses or mules are available for the use of the student. This latter feature offers the greatest



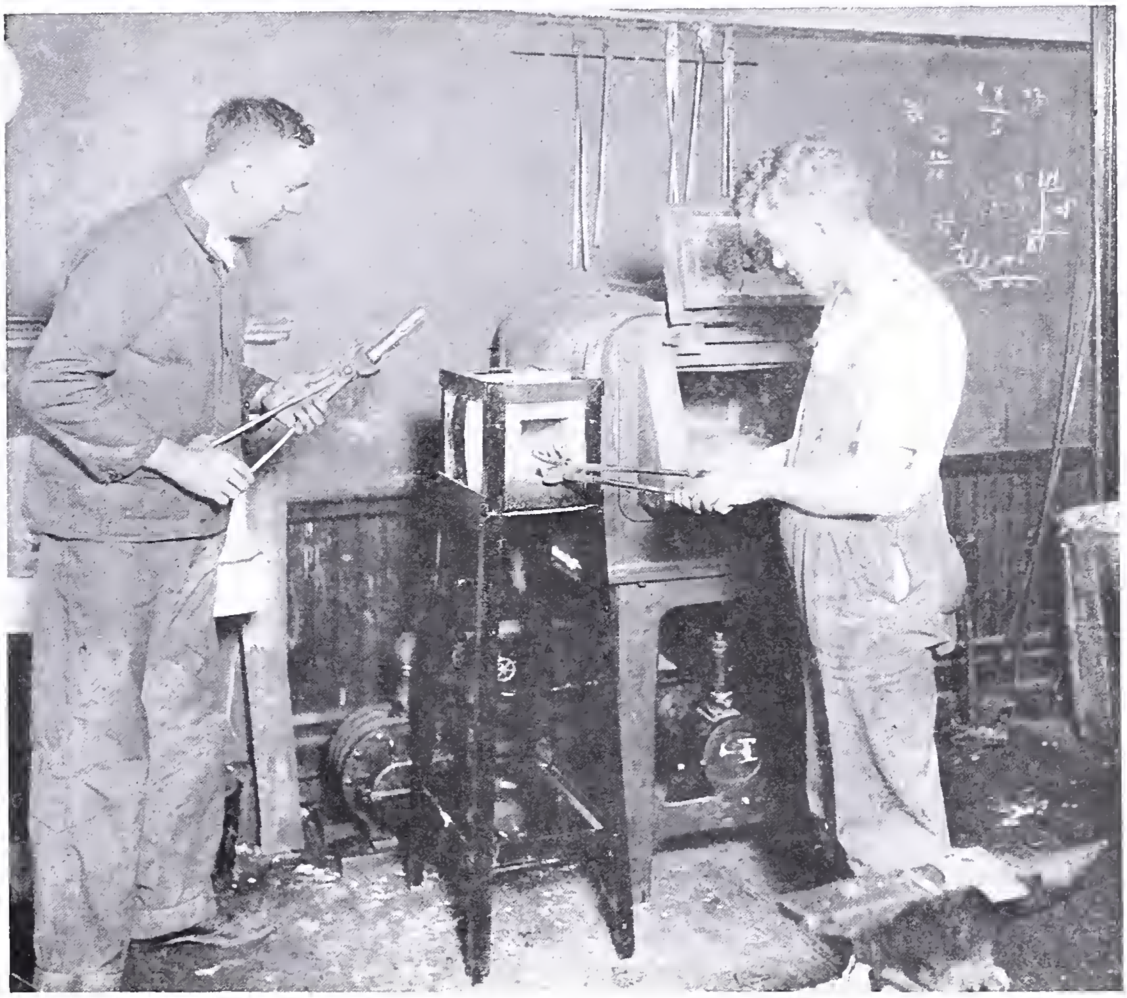
A concrete example of real work done by men of the Training Detachment at Mooseheart, Illinois

Soldier concrete workers are here demonstrating their knowledge acquired at Oswego State Normal drawback in successfully teaching horseshoers. The more mechanical operation of fitting the shoe, forming it, putting on the calks, etc., of course can be readily accomplished without the presence of horses, but the setting of the shoe, the trimming of the hoof, the preparation of the hoof, in fact the treatment of the horse necessarily requires the presence of the animal. One forge and anvil for each student is necessary. Also a complement of tools for each forge is necessary.

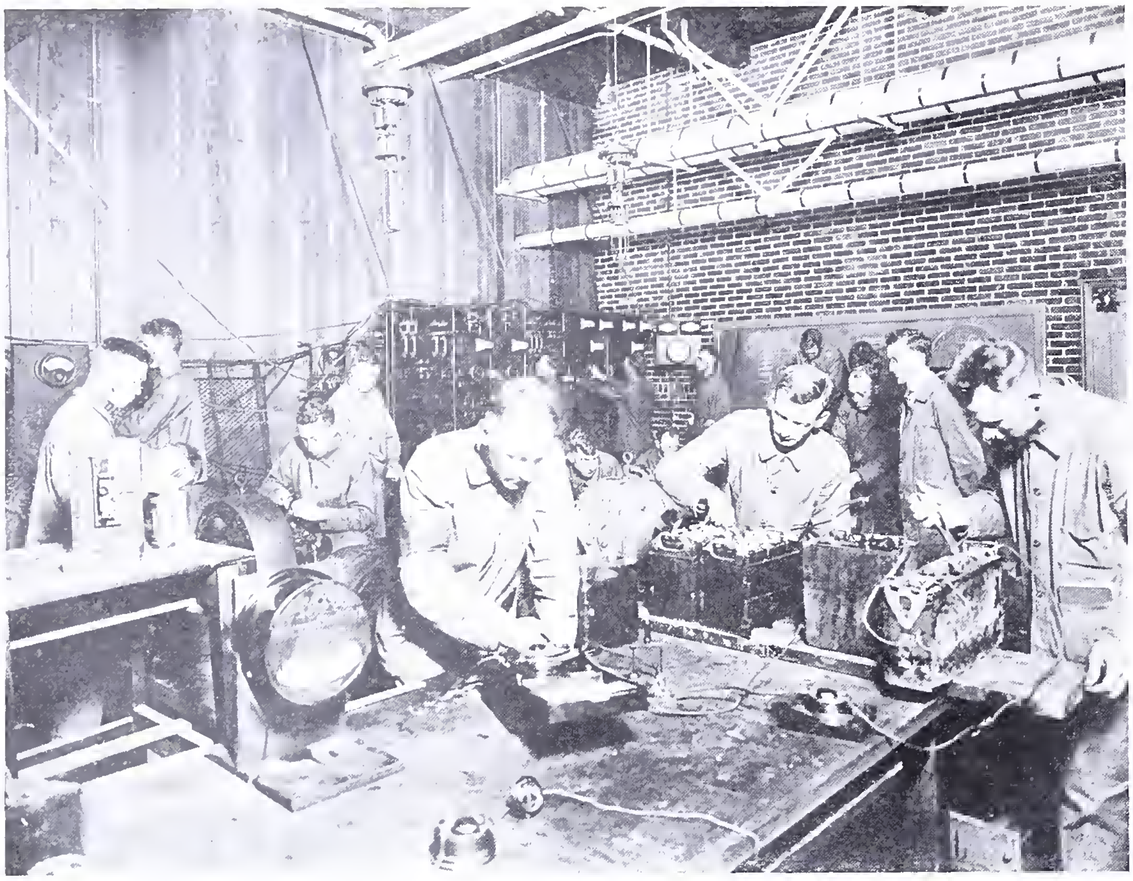
For the training of concrete men, a power mixer, half a dozen wheelbarrows, half dozen shovels, three carpenter's squares, three ripsaws, half dozen cross cut saws, half dozen hatchets for every fifteen men are necessary."

From the report of Bowman Technical School, Lancaster, Penna., by J. J. Bowman:

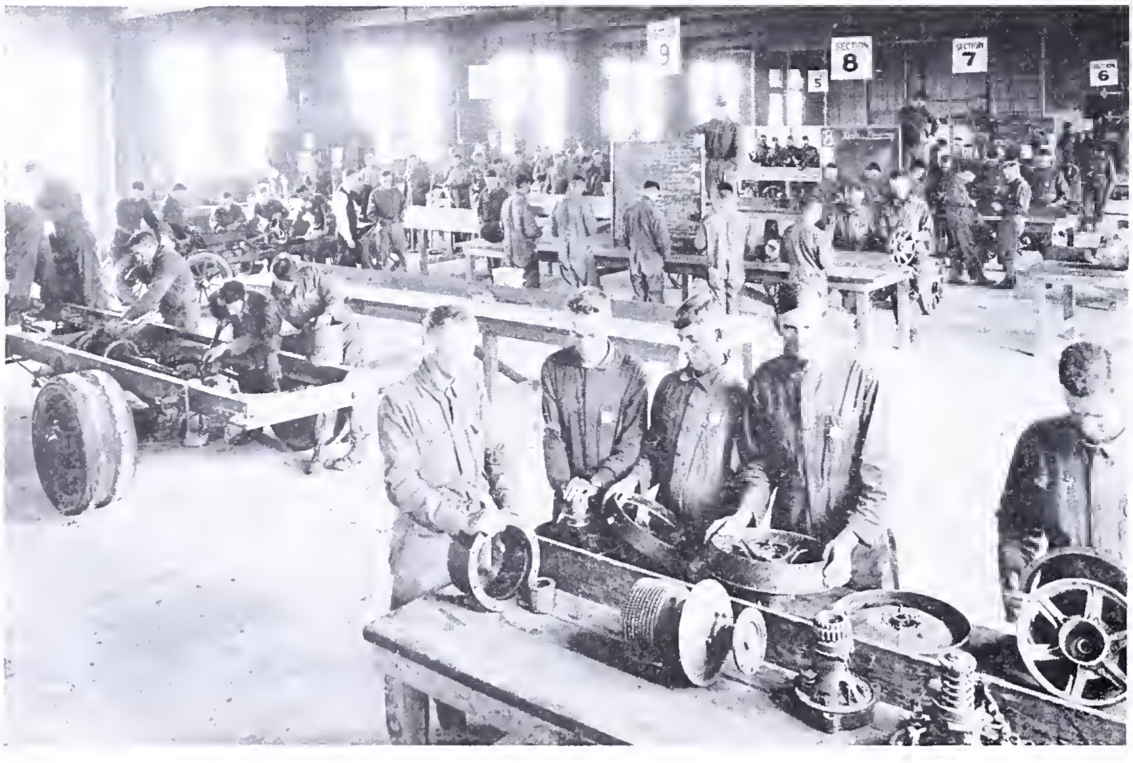
"By far the hardest thing to accomplish was to get together the mechanical equipment for the school. Several thousand pieces of small tools had to be obtained, and about sixty watchmakers' lathe outfits. The usual sources of supply were found empty, for the familiar war-time reasons, and our recourse had to be a laborious fine-combing of the retail watch trade by mail and by personal canvassing; from "door to door" purchase of much of the equipment, buying in small lots, to collect the quantity needed."



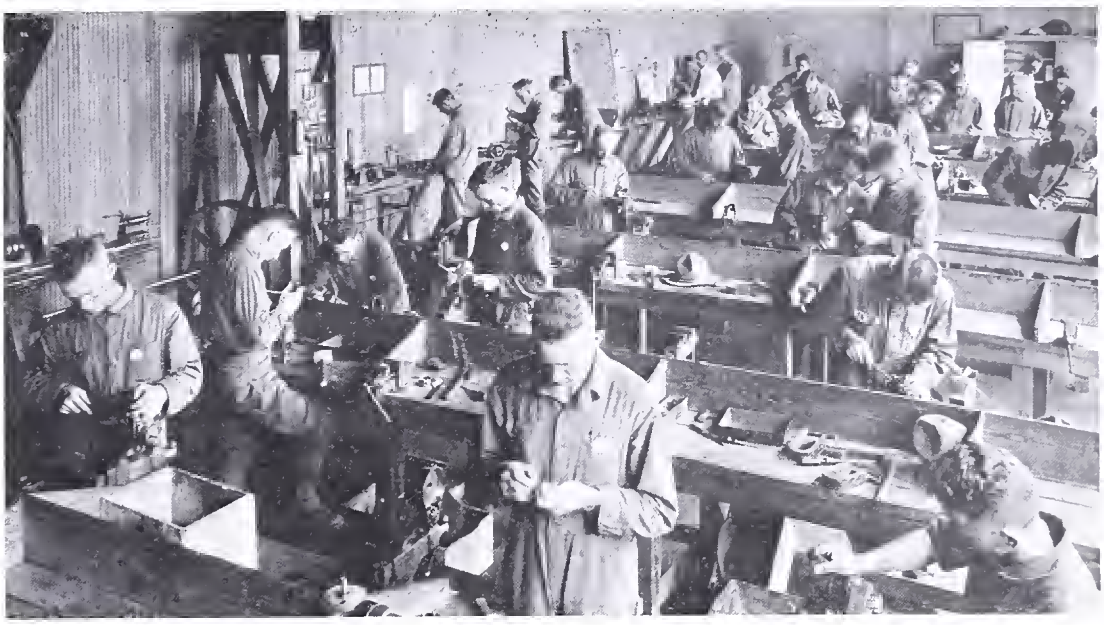
This small furnace was built by the students themselves out of angle iron and fire brick.
Seneca Vocational School, Buffalo, N. Y.



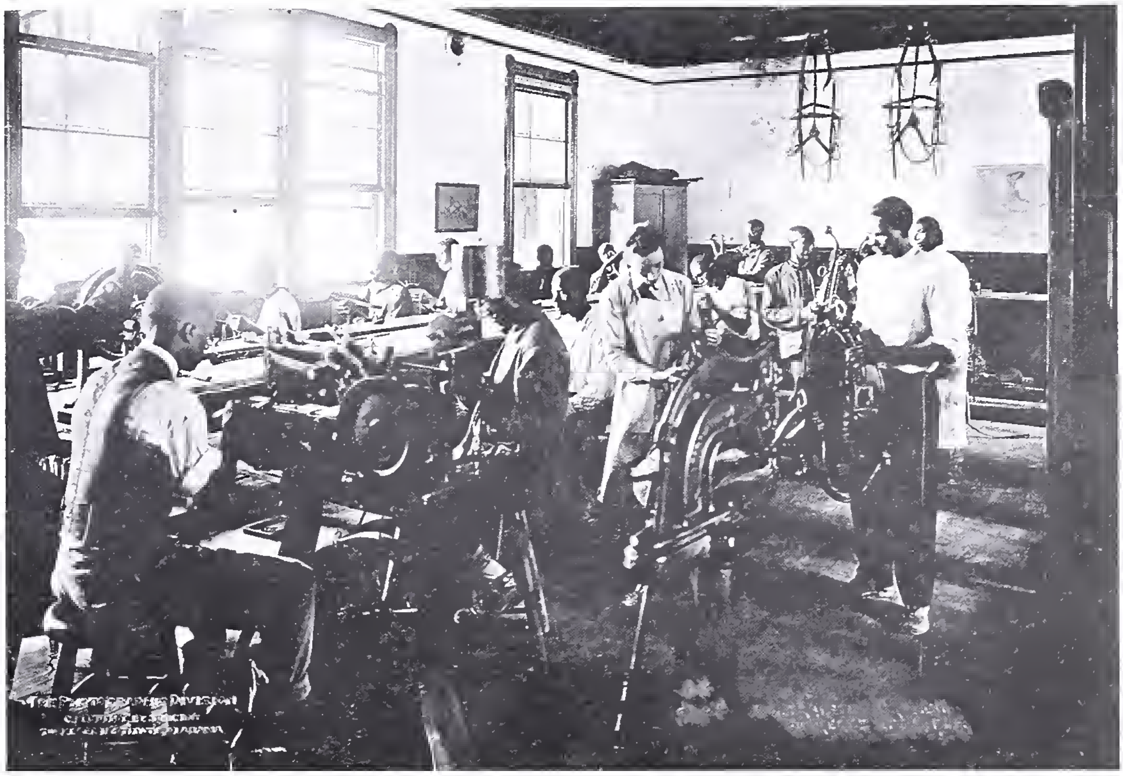
Storage battery repairing at Benson Polytechnic Institute



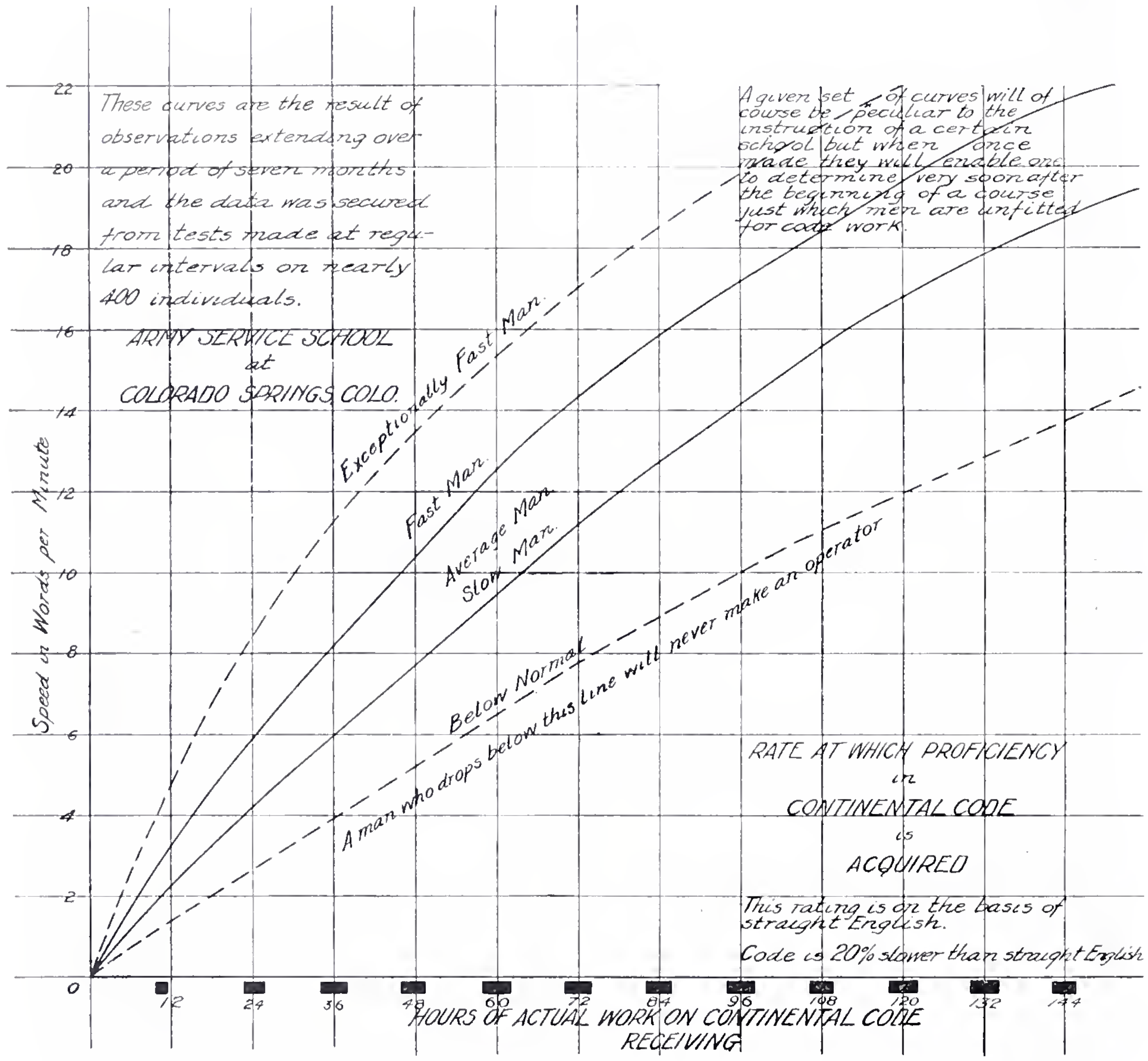
Chassis laboratory accommodating 300 men at University of Texas Training Detachment



Ignition repair department at University of Texas Training Detachment. A well designed bench for economized utilization of floor space. The pan in each stall is a time saving accessory to the novice dismantling a piece of mechanism containing a large number of small parts.



Class in harness making at Tuskegee Institute Training Detachment



These curves are the result of observations extending over a period of seven months and the data was secured from tests made at regular intervals on nearly 400 individuals.

ARMY SERVICE SCHOOL
at
COLORADO SPRINGS, COLO.

A given set of curves will of course be peculiar to the instruction of a certain school but when once made they will enable one to determine very soon after the beginning of a course just which men are unfitted for code work.

RATE AT WHICH PROFICIENCY
in
CONTINENTAL CODE
is
ACQUIRED

This rating is on the basis of straight English.

Code is 20% slower than straight English.

Chart showing rate at which proficiency in code is acquired at Colorado College

LENGTH OF COURSES

Administrative difficulties made certain methods of procedure necessary, which of course would not have been followed from a purely educational point of view. It was necessary to function with the Provost Marshal's standard regulations necessitating the ordering of so many men at a definite time and allowing sufficient time for the order to clear through the various offices and for the men to receive their transportation and arrive at the schools on time. Similarly, men moved from the schools had to be reported two or three weeks in advance of their movement. The movement of a few men required as much detailed manipulation as the movement of a large number, and when such men are scattered all over the United States it at once became evident that it was more expedient to set an arbitrary time limit on the training period for the courses at all the Training Detachments. The administrative difficulty of handling the men at the institutions also supported the wisdom of this decision. It was done, however, with full consciousness of the varying nature and contents of the different courses. While the training period for all the courses was made uniform at the start, a few changes had been made prior to the signing of the armistice. A four weeks' course for truck drivers for the Motor Transport Corps was established, and it proved quite satisfactory. On the other hand, a thirteen weeks' course for telephone electricians demonstrated the value of the additional time devoted to training men for this army trade.

Data were being accumulated and studied for the purpose of improving methods and thereby shortening the time of training radio operators. The figure on opposite page illustrates the relation of proficiency to time in training based on a wide range of experiments conducted at Colorado College. Similar experimentation was in process at other Training Detachments. Demobilization orders brought the efforts in this direction to a premature conclusion.

The following are comments on this topic taken from final reports of Training Detachments:

From report of University of Akron, by Dean Fred E. Ayer:

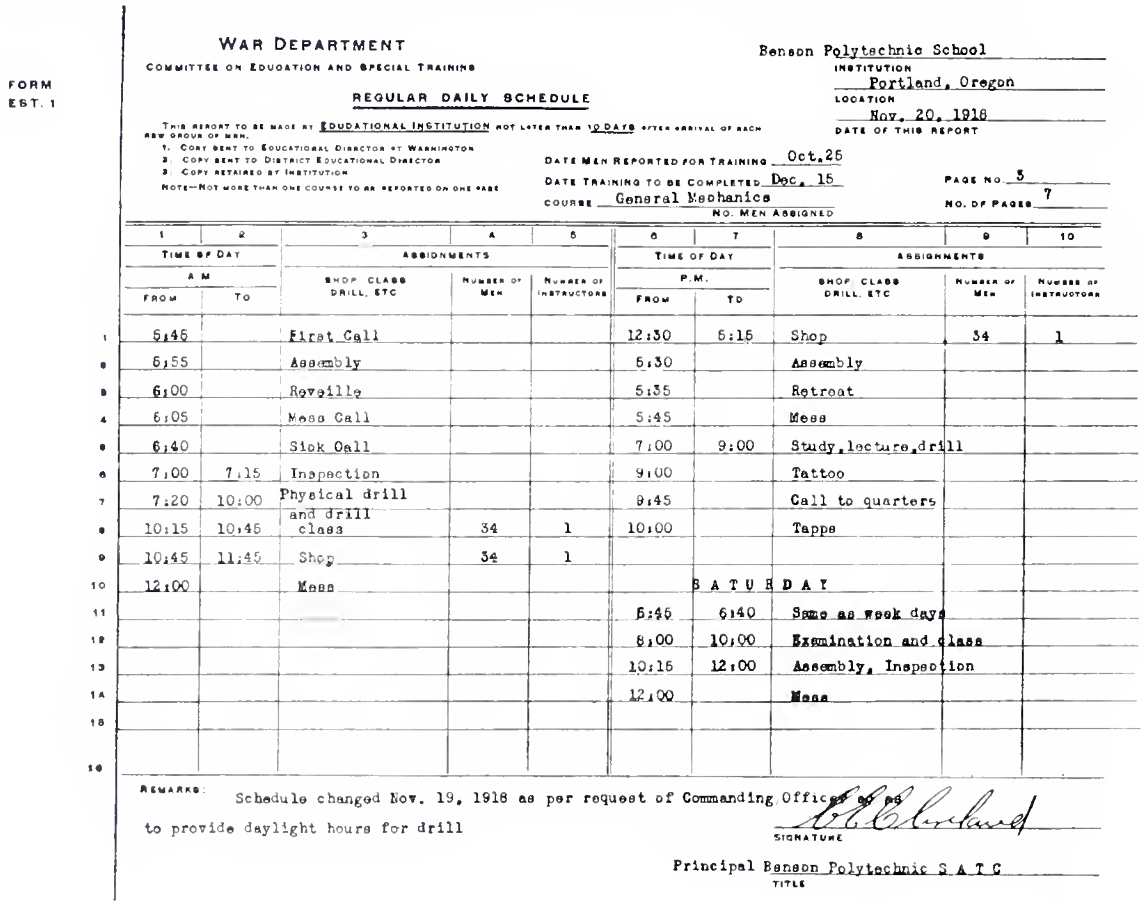
"One month was found long enough to give all the instruction necessary in tire repairing. The only advantage to have been gained by making the course longer would have been to fix the operations more firmly in the minds of the students and would have developed greater speed in workmanship."

From report of University of Tennessee, by Charles E. Ferris:

"The practical length of training period naturally depends on the trade. It would seem to range from a minimum of three weeks to a maximum which would be fixed with difficulty, though six months might be suggested. It is clearly demonstrated that the four years' period formerly thought necessary to learn a trade is wasteful of time; that a trade may be taught quite as well in a fraction of the time when the man taught is the real product of the effort, rather than the accidental product of a manufacturing enterprise."

From New Hampshire College, by C. E. Hewitt:

"Our conclusions are that these training periods should be varied for different courses. It is possible to train an auto truck driver simply as a driver in one month's time, so that he can handle a truck well. On the other hand, it would be absurd to train an auto mechanic in two months, unless he had had previous training. A carpenter can be trained for rough work within the two months' period and with good material to work on, you ought to be able to rate him as a journeyman in that length of time, although a longer period would be desired. It would be impossible to train a machinist even in a much longer time, unless he had had previous experience. It is possible to train a blacksmith for general repair work in the time allowed. It has been found possible to train telephone electricians, who have had some previous experience, in the three months or thirteen weeks, which was devoted to this class of work. However, a longer period would be desired. Students can be trained in plain electric wiring within the two month's time."



FORM
EST. 1

WAR DEPARTMENT
COMMITTEE ON EDUCATION AND SPECIAL TRAINING

REGULAR DAILY SCHEDULE

THIS REPORT TO BE MADE BY EDUCATIONAL INSTITUTION NOT LATER THAN 10 DAYS AFTER ARRIVAL OF EACH NEW GROUP OF MEN.
1. COPY SENT TO EDUCATIONAL DIRECTOR AT WASHINGTON
2. COPY SENT TO DISTRICT EDUCATIONAL DIRECTOR
3. COPY RETAINED BY INSTITUTION
NOTE—NOT MORE THAN ONE COURSE TO BE REPORTED ON ONE PAGE

Benson Polytechnic School
INSTITUTION
Portland, Oregon
LOCATION
Nov. 20, 1918
DATE OF THIS REPORT

DATE MEN REPORTED FOR TRAINING Oct.25
DATE TRAINING TO BE COMPLETED Dec. 15
COURSE General Mechanics
NO. MEN ASSIGNED

PAGE NO. 3
NO. OF PAGES 7

	1	2	3	4	5	6	7	8	9	10
	TIME OF DAY		ASSIGNMENTS			TIME OF DAY		ASSIGNMENTS		
	A M					P.M.				
	FROM	TO	SHOP CLASS DRILL, ETC	NUMBER OF MEN	NUMBER OF INSTRUCTORS	FROM	TO	SHOP CLASS DRILL, ETC	NUMBER OF MEN	NUMBER OF INSTRUCTORS
1	5:45		First Call			12:30	5:15	Shop	34	1
2	5:55		Assembly			5:30		Assembly		
3	6:00		Reveille			5:35		Retreat		
4	6:05		Mess Call			5:45		Mess		
5	6:40		Sick Call			7:00	9:00	Study, lecture, drill		
6	7:00	7:15	Inspection			9:00		Tattoo		
7	7:20	10:00	Physical drill			9:45		Call to quarters		
8	10:15	10:45	and drill class	34	1	10:00		Tapps		
9	10:45	11:45	Shop	34	1					
10	12:00		Mess				SATURDAY			
11						5:45	6:40	Same as week days		
12						8:00	10:00	Examination and class		
13						10:15	12:00	Assembly, Inspection		
14						12:00		Mess		
15										
16										

REMARKS: Schedule changed Nov. 19, 1918 as per request of Commanding Officer so as to provide daylight hours for drill

SIGNATURE

Principal Benson Polytechnic S A T C
TITLE

DAILY SCHEDULE

Educational Instructions No. 11, sent to all of the Training Detachments, fixed the uniform division of time at six hours for vocational instruction and three hours for military instruction per day including one hour per week given to War Issues Course. The sub-division of the three hours for military instruction was left to the judgment of the respective commanding officers. Likewise, the division of the six hours for vocational instruction was left to the judgment of the respective educational supervisors. General supervision was exercised over the training schedules yet no attempt was made to fix the distribution of time except with respect to its division between military and vocational work. The facilities and equipment of each school, the personnel of the faculty, the arrangements for barracks and mess, climatic conditions and other factors created a problem at each Training Detachment which could best be handled locally.

The schedules for the vocational instruction varied according to the nature of the various courses. For example, the major portion of the course for telegraphers consisted in practice at operating the key and comparatively little time was devoted to the study of the underlying principles of electricity, while, on the other hand, the course for telephone electricians required a comparatively large amount of time to be devoted to acquiring the technical information necessary to properly set up and keep in repair the telephone, hand and central exchanges, and cable and hand lines, and furthermore the work of the telegraphers involved the fatigue factor, making it necessary to schedule five to ten minute relaxation periods while in the courses for blacksmiths and carpenters, this factor was negligible.

For some courses it was possible to outline an instruction schedule which would fairly represent the progress of the average student, thus enabling the head of the institution or educational supervisor to program the assignment of teachers, use of laboratories, equipment, etc. A method of taking care of the individuals who either forged ahead or dropped behind their associates is explained in the following extract from the final report of the course for radio operators of the University of Minnesota Training Detachment:

> "This section of fifty men is divided into four classes: 'A,' 'B,' 'C,' and 'D,' with 10 to 14 men in each. At the beginning of the course the men are divided alphabetically into these four classes where they remain for three weeks.
>
> During this time each man is classified as good or poor in theory and good or poor in key work. At the end of the third week, those classified as good in theory and good in key work are transferred to Class 'A'; those good in theory and poor in key work are transferred to Class 'B'; those poor in theory and good in key work are transferred to Class 'C'; and those poor in theory and poor in key work are transferred to Class 'D.' After this transfer is made

	Code		Code Practice		Instruction	Conference	Laboratory Work		Field Work	
ROOM	5	10	3	11	27	30	East	West	Yard	N.Door
MONDAY										
8:30—9:20	A	C		D 1-4	B 1-4					
9:25—10:15	"	"	B 1-4		D 1-4					
10:20—11:10	B	D		C 1-4	A 1-4					
11:15—12:05	"	"	A 1-4		C 1-4					
1:40—2:45	A	C		D 1-4	B 1-4					
2:50—4:00	B	D	A 1-4		C 1-4					
TUESDAY										
8:30—9:20	B	D					C 1-2	C 3-4	A 1-2	A 3-4
9:25—10:15	"	"					"	"	"	"
10:20—11:10	A	C					B 3-4	B 1-2	D 3-4	D 1-2
11.15—12:05	"	"					"	"	"	"
1:40—2:45	B	D		C 1-4	A 1-4					
2:50—4:00	A	C	B 1-4		D 1-4					
WEDNSDAY										
8:30—9:20	A	C					D 1-2	D 3-4	B 1-2	B 3-4
9:25—10:15	"	"					"	"	"	"
10:20—11:10	B	D.					A 3-4	A 1-2	C 3-4	C 1-2
11:15—12:05	"	"					"	"	"	"
1:40—2:45	A	C	B 1-4	D 1-4						
2:50—4.00	B	D	A 1-4	C 1-4						
THURSDAY										
8:30—9:20	B	D					A 1-2	A 3-4	C 1-2	C 3-4
9:25—10:15	"	"					"	"	"	"
10:20—11:10	A	C					B 1-2	B 3-4	D 1-2	D 3-4
11:15—12:05	"	"					"	"	"	"
1:40—2:45	B	D			A 1-4	C 1-4				
2:50—4:00	A	C			B 1-4	D 1-4				
FRIDAY										
8:30—9:20	A	C					D 3-4	D 1-2	B 3-4	B 1-2
9:25—10:15	"	"					"	"	"	"
10:25—11.10	B	D					C 3-4	C 1-2	A 3-4	A 1-2
11:15—12:05	"	"					"	"	"	"
1:40—2:45	A	C			D 1-4	B 1-4				
2:50—400	B	D			C 1-4	A 1-4				
SATURDAY										
8:30—9:55	B	D			A - C	QUIZ				
10:00—11:25	A	C			B - D					

Schedule for radio operators in use at Univerity of Colorado others will follow throughout the remainder of the course at intervals of one week. During the last two weeks some men not qualified in theory are taken out of the theory work and given extra key work.

Classes 'A' and 'B' specialize in laboratory work and lectures while classes 'A' and 'C' specialize in key work. In this way we have one good all-round class, and one good theory class, and one good key class.

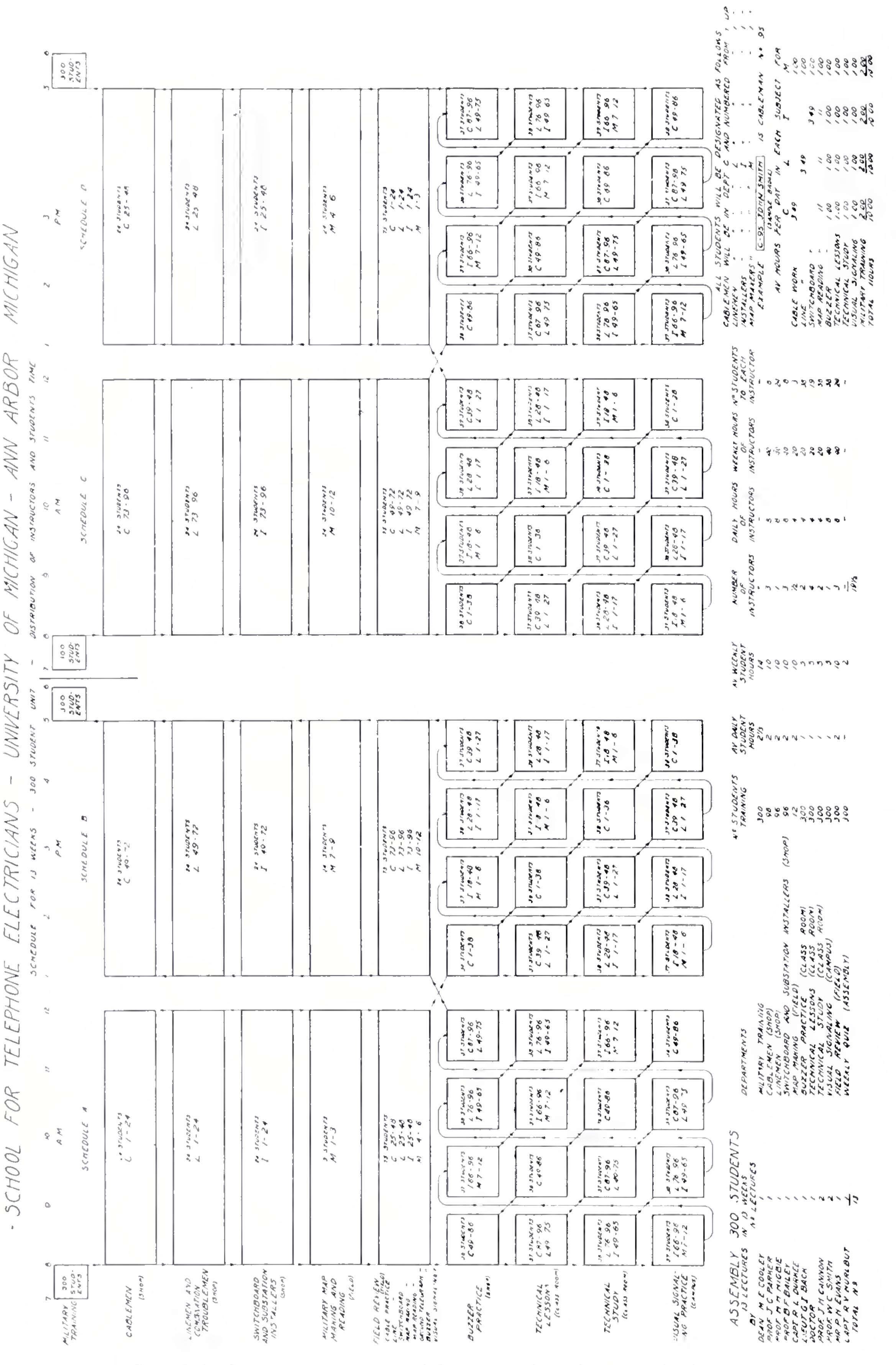
Each day, with the exception of Saturday, is divided into seven periods, as follows:

First period	8.30 to 9.15
Second period	9.20 to 10.05
Third period	10.10 to 10.55
Fourth period	11.00 to 11.45
Fifth period	1.00 to 1.55
Sixth period	2.00 to 2.55
Seventh period	3.00 to 4.00

A War Aims lecture is given to the entire Section on Wednesday from three to four o'clock. Saturday morning is divided into two 95-minute periods."

A record was kept in the Washington office of the daily schedule of every Training Detachment. On page 90 is shown the form used and contains the daily schedule of the Benson Polytechnic Training Detachment.

Many ingenious schemes were developed by the educational supervisors of the various Training Detachments. A few of the representative types are shown on pages 92, 94, 95.


SCHOOL FOR TELEPHONE ELECTRICIANS - UNIVERSITY OF MICHIGAN - ANN ARBOR MICHIGAN
SCHEDULE FOR 13 WEEKS - 300 STUDENT UNIT - DISTRIBUTION OF INSTRUCTORS AND STUDENTS TIME
SCHEDULE A
SCHEDULE B
SCHEDULE C
SCHEDULE D
A M
P M
MILITARY TRAINING
CABLEMEN
LINEMEN AND COMBINATION TROUBLEMEN
SWITCHBOARD AND SUBSTATION INSTALLERS
MILITARY MAP MAKING AND READING
FIELD REVIEW
BUZZER PRACTICE
TECHNICAL LESSONS
TECHNICAL STUDY
VISUAL SIGNALING PRACTICE
300 STUDENTS
ASSEMBLY 300 STUDENTS
DEPARTMENTS
NUMBER OF INSTRUCTORS
DAILY HOURS INSTRUCTORS
WEEKLY HOURS OF INSTRUCTORS
NO STUDENTS TO EACH INSTRUCTOR
AV HOURS PER DAY IN EACH SUBJECT
TOTAL HOURS

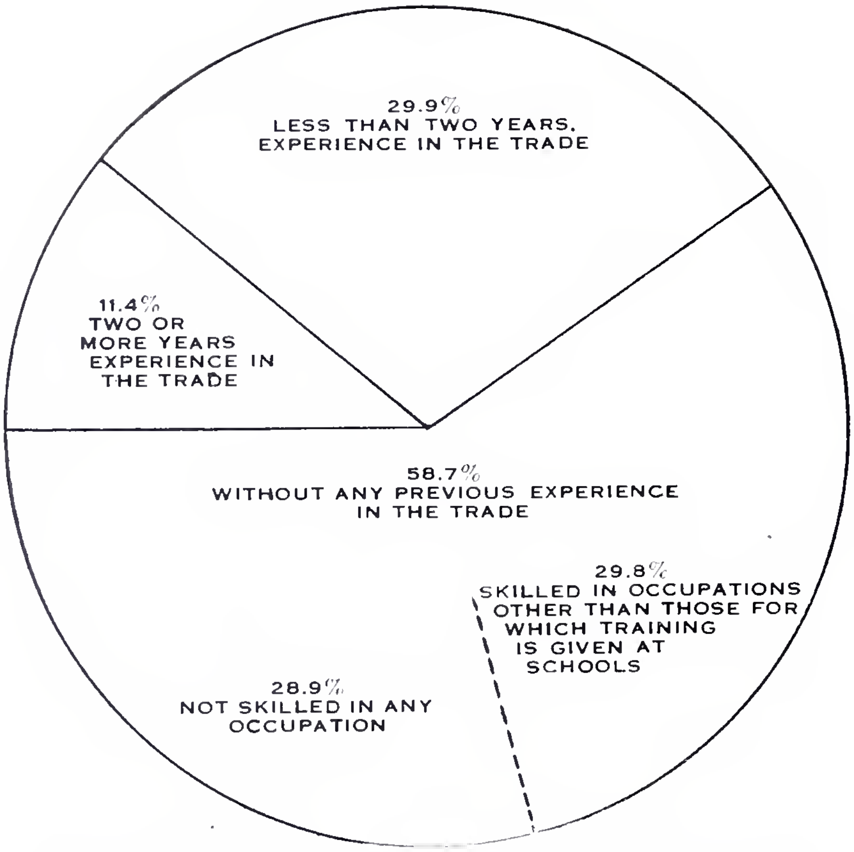
Schedule for telephone electricians. University of Michigan.

RADIO

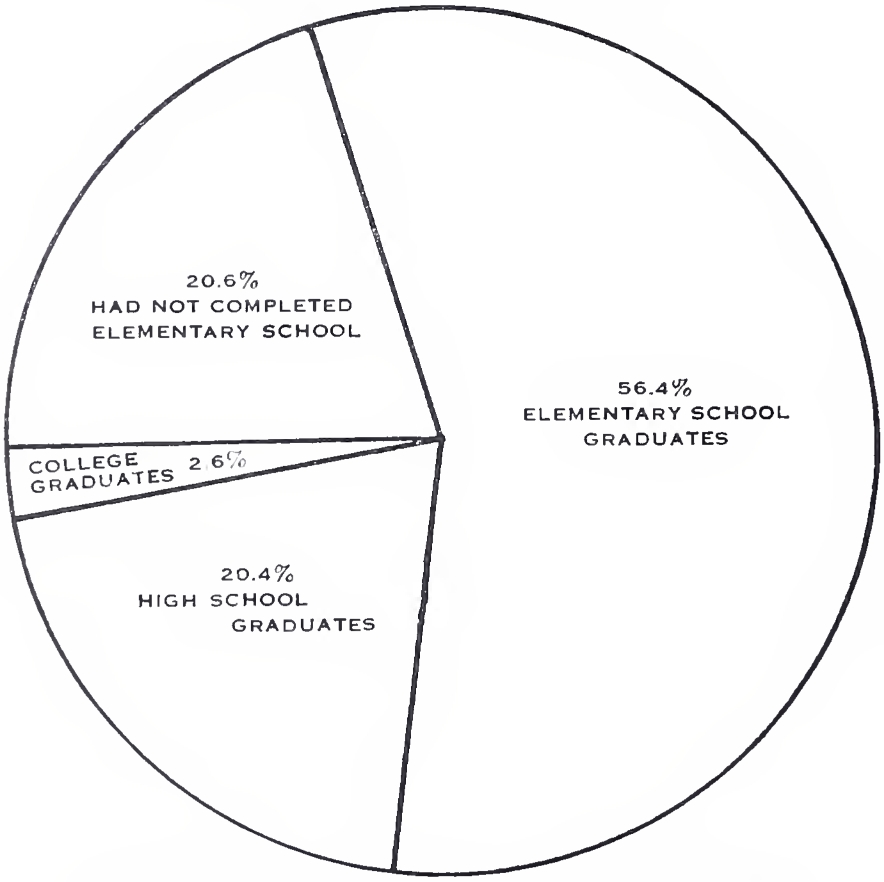
	Period	M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S	M	T	W	T	F	S
		1st Week						2nd Week						3rd Week						4th Week						5th Week						6th Week						7th Week						8th Week					
Group A	1	1	9	1	9	1	9	2	9	3	9	3	9	4	9	4	9	4	9	4	9	4	9	4	9	5	9	5	9	5	9	5	9	5	9	5	9	7	9	7	9	7	9	7	9	7	9	7	9
	2	9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9	
	3	9	9	9	9	9		9	9	9	9	9		10	9	9	9	9		10	9	9	9	9		8	8	9	9	9		10	9	9	9	9		10	9	9	9	9		9	9	9	9	9	
	4	9	6	9	8	9		9	6	9	6	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	6	9	6	9		9	9	9	9	9	
Group B	1	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	2	1	9	1	9	1		2	9	3	9	3		4	9	4	9	4		4	9	4	9	4		5	9	5	9	5		5	9	5	9	5		7	9	7	9	7		7	9	7	9	7	
	3	9	9	9	9	9		9	9	9	9	9		10	9	9	9	9		10	9	9	9	9		9	9	8	8	9		10	9	9	9	9		10	9	9	9	9		9	9	9	9	9	
	4	9	6	9	6	9		9	6	9	6	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	6	9	6	9		9	9	9	9	9	
Group C	1	9	1	9	1	9	1	9	2	9	3	9	3	9	4	9	4	9	4	9	4	9	4	9	4	9	5	9	5	9	5	9	5	9	5	9	5	9	7	9	7	9	7	9	7	9	7	9	7
	2	9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9	
	3	9	9	9	9	9		9	9	9	9	9		10	9	9	9	9		10	9	9	9	9		9	9	9	9	9		10	8	8	9	9		10	9	9	9	9		9	9	9	9	9	
	4	9	9	9	9	9		9	9	9	9	9		9	6	9	6	9		9	6	9	6	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	6	9	6	9	
Group D	1	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	2	9	1	9	1	9		9	2	9	3	9		9	4	9	4	9		9	4	9	4	9		9	5	9	5	9		9	5	9	5	9		9	7	9	7	9		9	7	9	7	9	
	3	9	9	9	9	9		9	9	9	9	9		10	9	9	9	9		10	9	9	9	9		9	9	9	9	9		10	9	9	8	8		10	9	9	9	9		9	9	9	9	9	
	4	9	9	9	9	9		9	9	9	9	9		9	6	9	6	9		9	6	9	6	9		9	9	9	9	9		9	9	9	9	9		9	9	9	9	9		9	6	9	6	9	

1. Direct and Alternating Currents: conductors and insulators, resistance, heating, magnetic and chemical effects, electrolysis, units of pressure, current, power, conversion units, circuits constants, Ohm's Law.
2. Measuring instruments, voltmeter, ammeters, wattmeters, hydrometers, battery testers, galvanometers, constructions and uses.
3. Simple calculations: properties of solid and stranded wires, wire table, allowable current densities, determination of currents from required power and voltage in D. C. and A. C. motor wiring.
4. Batteries: primary, types and uses, testing; secondary, construction, charging and discharging, testing and care, lead and Edison Cells.
5. Dynamos and Motors: D. C. and A. C. generators and motors parts and functions, care, operation and performance, transformers, connections, circuit breakers and fuses.
6. Telegraph and Telephone Wiring: outside construction, poles, guys, insulators, protections, transpositions. Conduit and inside construction, splicing, man-holes, etc.
7. Simple Electrical Measurements: testing lines for opens, grounds, in-crosses, determination of resistance, use of Wheatstone Bridge and Varley Loop, location of faults, joining wires, soldering and taping joints.
8. Telephony: Theory and assemblage of telephone instrument parts, "trouble shooting."
9. Telegraphy: Code sending and receiving, details of wireless apparatus.
10. Quizzes.

Schedule for radio operators used at Colorado College



Classification of men on basis of previous trade experience



Classification of men on the basis of previous education

PREVIOUS TRADE EXPERIENCE OF MEN IN TRAINING DETACHMENTS

The nationalities, occupations, and geographical locations, represented by the men in the training detachments was an admixture typically cosmopolitan in nature. East side New York contributed its proportion of the garment worker and Bowery type, the New England and Central States sent a larger portion of industrial workers, while the West and South sent farmers and cattle ranchers, and the northwest, lumbermen.

A study was made of the men who had finished training at a selected group of representative institutions. A classification of these men (11,132 in number) on the basis of their previous experience in the trade in which they were receiving training is shown on the opposite page. The classification on the basis of their educational preparation is also shown on the opposite page. On page 101 is shown the classification of the men upon the completion of the courses on the basis of their ability as attested to by the educational supervisors of the schools.

Of the 11,132 men sent to approximately 60 different schools, 3,261 had had previous experience in occupations other than those given at the schools to which they were sent. Of this number 1,980 represent occupations for which training was not given in any of the schools and 1,281 represent occupations for which training was given at some of the schools but not at the schools where men with experience in them were sent. This latter number represents deficiency in the system for getting men through the draft boards and to some extent the improper functioning of the draft boards through the existing system. This condition was pointed out in the beginning and numerous suggestions were made to overcome it, principally by sending the men first to mobilization camps and then sorting and sending them to the schools. Many administrative difficulties prevented this, although at the time of the armistice, plans for recruiting the men through the depot brigade were under very active discussion. However this number of misplaced men when compared with the total number of men handled under existing conditions, is not nearly as large as might have been expected.

The following are extracts from reports of Training Detachments on the subject of the education and previous trade experience of the men:

From the Report of the University of Chicago, by E. T. Filbey:

"It is the general impression of those who have had to do with the training of Section B men in the University, that the maturity and previous experience have more to do with satisfactory progress through the short unit training course than does either exceptional natural ability or previous school training. In other words successful vocational experience and maturity seem to

LIST OF OCCUPATIONS REPRESENTING THE 29.8 PER CENT, AS SHOWN ON PAGE 96.

Occupation	No. Men
*Airplane Mechanic	1
Architect	4
Artist, (Camouflage)	6
Banker & Broker	5
Boiler Maker	14
Brush Maker	1
Canvas Worker	1
Chemist	10
Civil Engineer	17
Compress Air Operators	3
Cooper	2
Crane Operator	10
Detective, Policeman	9
Engraver, Stencil & Die	4
Fire Dept. Man	8
Gas Plant Worker	2
Heating & Ventilating Engr.	2
*Instrument Maker	19
Laundryman	6
Mathematician	1
Accountant	81
*Auto Mechanic	77
Baker and Cook	21
Barber	43
*Blacksmith	27
Bricklayer	18
Butcher	33
*Carpenter	41
*Chauffeur—Auto	123
*Chauffeur—Truck	148
Clerical Worker	531
*Concrete Worker	17
*Construction Foreman	23
*Draftsmen	58
*Electrician	61
*Engineman & Fireman	138
*Foundryman	20
*Gasoline Engineman (not auto)	5
*Gunsmith	5
Horse—care of	53
Inspector	32
*Leather Worker	29
Metal Finisher	2
Millwright	11
Munitions Worker	4
Physicist	1
Pigeon Fancier	2
Plasterer	4
Purchasing Agent	8
Refrigeration Operator	12
Rigger & Cordage Worker	1
*Rubber Worker	19
Stevedore	1
Transportation Man	4
Undertaker	8
Upholsterer & Trimmer	7
Water Supply Man	1
*Welder	6
Writer	2
Business Man	13
Cut Glass Worker	1
Sawyer	35
Linotype	1
Farmer	369
Sawmill	3
Druggist	4
Salesman	16
Loom Fixer	3
Shoe Repairer	1
*Lineman	20
Lumberman	29
*Machinist	83
Mariner & Boatman	1
Medical Man	10
Merchant	117
Miner	36
*Musician—Band	25
Painter	69
Photographer	7
*Pipe Fitter	74
Printer	101
R. R. Operating Man	68
Road Worker	7
*Sheet Metal Worker	29
Stenographer, Typist	105
Stock-keeper	68
Struct'l Steel & Iron Worker	15
*Surveyor	17
Tailor	19
*Telegrapher inc. wireless	26
*Telephone Opr. & Repairman	27
Total	3261

*Occupation for which training was given at some of the schools but not at the schools to which men of previous experience in this occupation were sent.

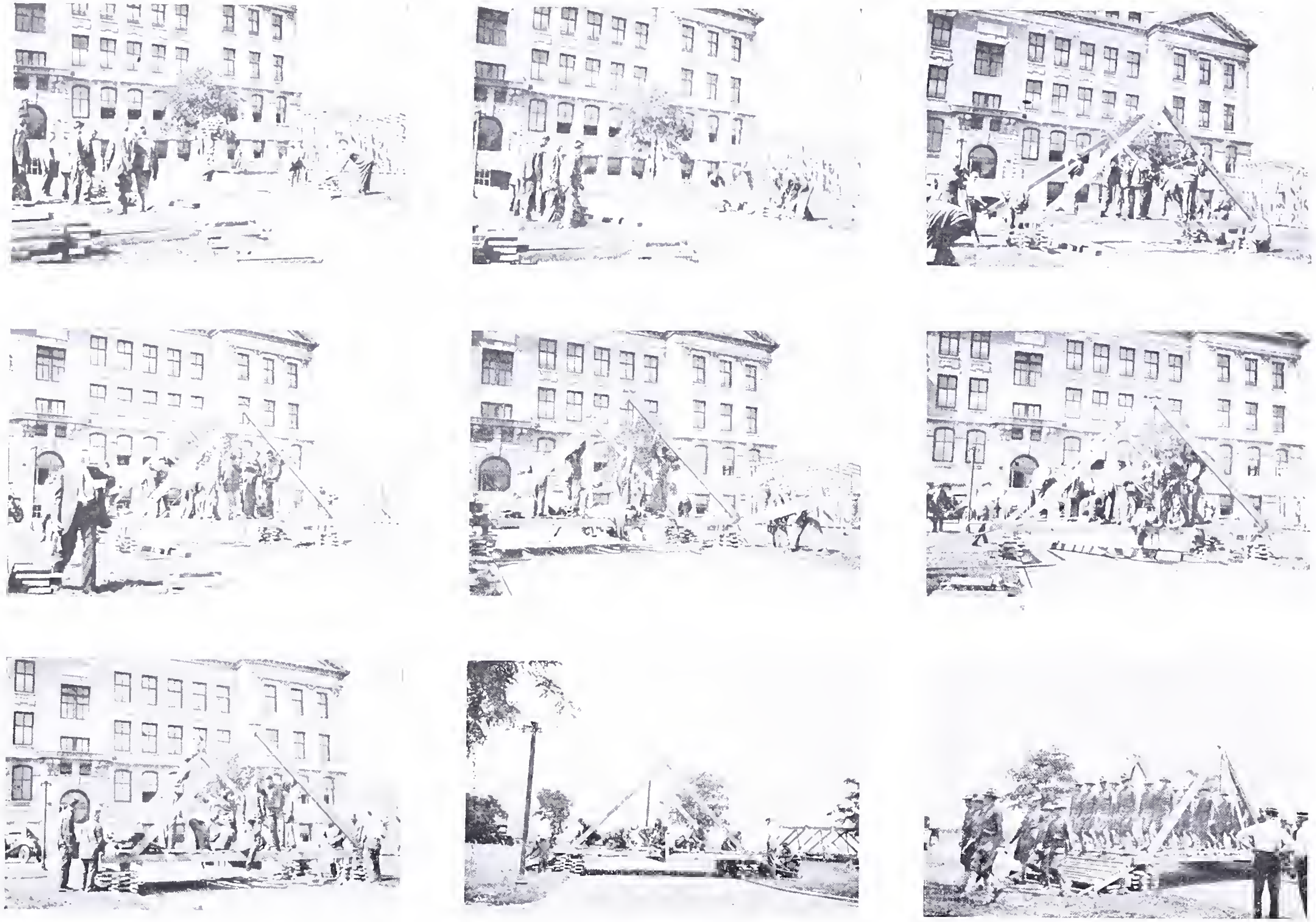
be safer guides in selection of desirable candidates for training through the short unit course than does previous school training. It was our experience that some of the college graduates were perfect "dubs" both mentally and manually when it came to working independently on constructive work. Some men with less academic training were equally stupid, but the experience simply shows that the mere fact that an individual has had either a high school or college education does not guarantee his ability to use his head in connection with practical constructive work. One of the poorest men we had in the entire group was a former high school principal. A close second was a college graduate, a near third was a lawyer. On the other hand, one of the very best men found in the entire group was a sixth grade man and three of the best soldier assistants were eighth grade graduates. The following tabulation shows the distribution of men assigned to Topographical Drafting on basis of age, education, and quality of work done in the course. The grade and last year of school training represents averages for the age groups. It will be seen that ability and education increase with maturity.

Number	Age	Grade	Education
1	18	73.5	Third Yr. H. S.
7	19	69.7	One and one-half Yr. H. S.
5	20	72.5	Two and one-fourth Yr. H. S.
33	21	73.8	Two years of H. S.
18	23	78.3	Two and one-half Yr. H. S.
5	23	83.3	Three Yrs. H. S.
1	24	90.6	College Graduate.
2	27	91.5	One-half Yr. College.
1	28	89.0	College Graduate.

A tabulation covering the results of training in connection with the third detachment shows rather conclusively that maturity rather than training has a marked bearing upon successful results. In this detachment there were forty-two men between the ages of twenty-one and twenty-four who had no previous training or experience that would aid directly in the work of the course to which they were assigned. There were twenty-five similar men between the ages of twenty-five and thirty-two inclusive. The older men did nineteen per cent better work, that is, made that much better showing in progress points. They did this in spite of the fact that the younger group had an advantage of seventy-four per cent in education, based on training above the eighth grade. To the writer this simply means that technical work of the kind undertaken in connection with the courses administered in this institution does not demand specific school training beyond the eighth grade. It does demand good judgment, and this, it may be said, may be acquired either in school or out. Experience with the men in training indicate that, under the past system of organized school training, it was more often acquired out of school."

From the Report of Wilberforce University, by Superintendent Wm. A. Joiner:

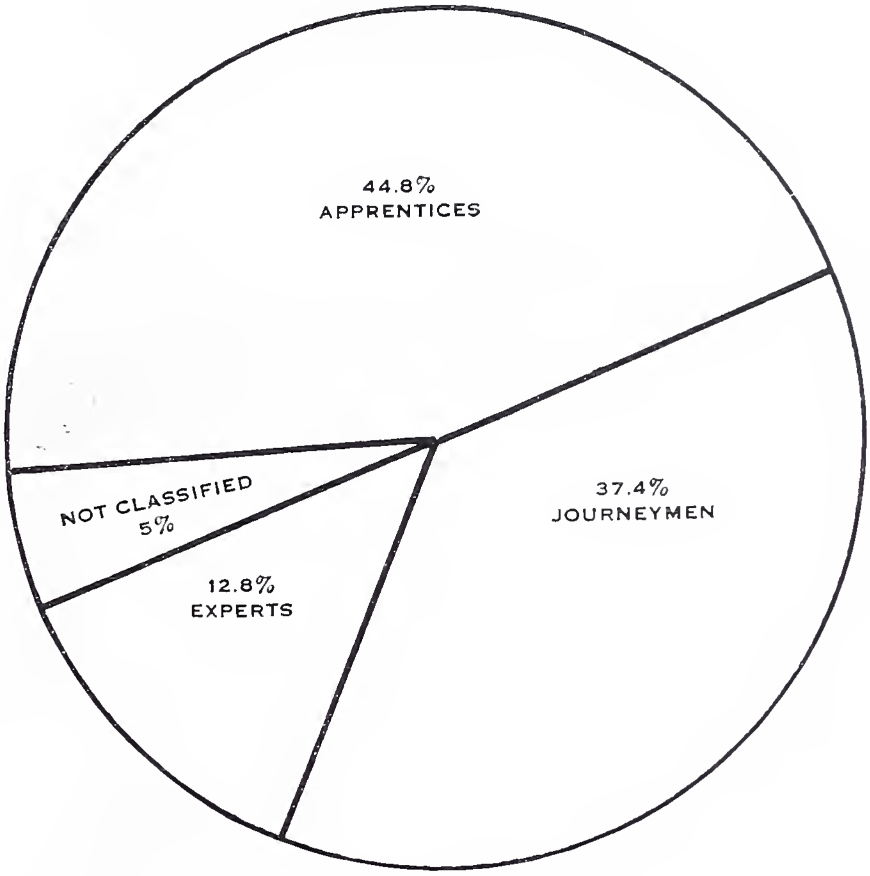
"Men whose questionnaire disclosed no clue as to their possible technical drift had to be assigned to courses which after careful consideration were



Jersey City Public Schools Training Detachment learning how to help the yanks across the Rhine guessed as best or most adaptable. It is realized that this procedure smacks of manufacturing a cobbler out of a babe or a machinist from almost inanimate matter, so far as the men's will and desire were concerned, yet out of twenty-two cobblers in the first detachment, eighty per cent of whom would not have made this course first choice, it would have been well nigh impossible to transfer ten per cent from that class to any other course after the first four weeks of training. At the end of the eighth week ninety-five per cent had made good, and had developed an esprit de corps unexcelled in the entire detachment."

From Report of University of Kansas, by George C. Shaad:

"We have had no experience with very mature men. Natural ability and previous education counted for more than past experience. In many cases past experience rather interfered with attempts to instruct along more efficient ways of doing the work. Enough mechanical experience to be able to use the hands effectively is very desirable in practically all of the courses offered."



Classification of men on basis of skill at completion of course

The University of Nebraska vitilized the training by manufacturing a commercial product

A large quantity of material was produced for the local munition plants by the machine shop and blacksmith shop at Nebraska University Training Detachment

MATERIAL PRODUCT

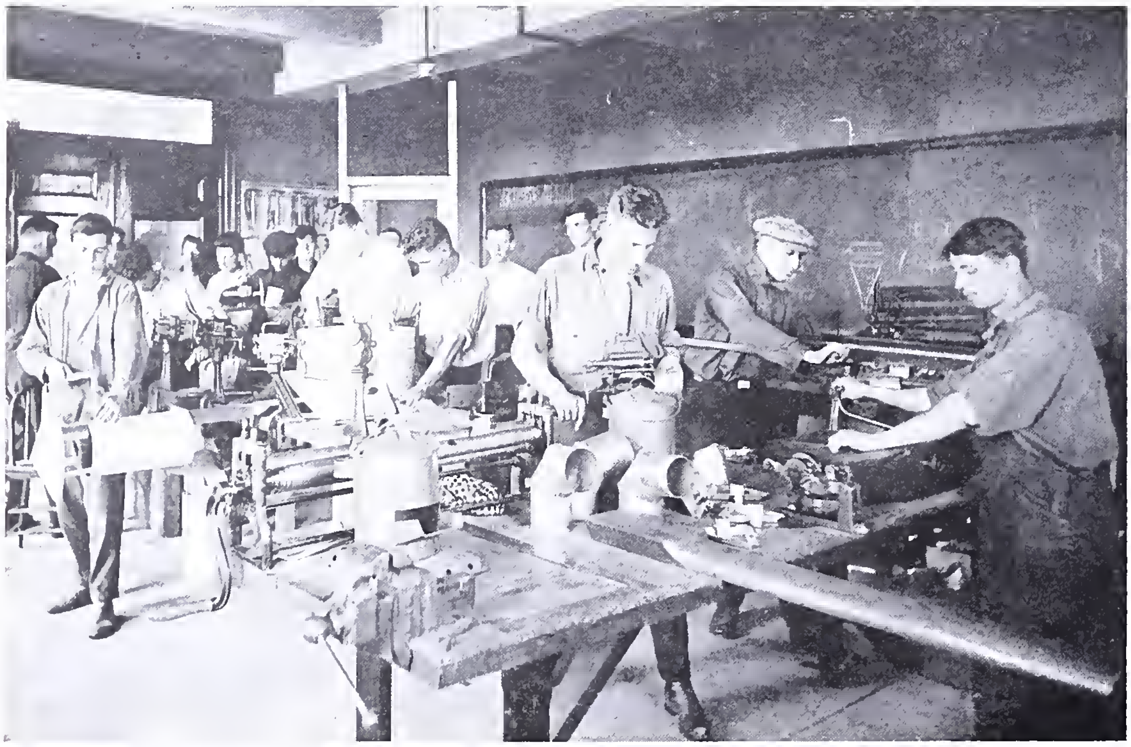
The fundamental educational principle of all the training work was to learn by doing. The equipment, teaching method, job sheets, all called for self-educative effort. The army jobs in the field service called for the best and quickest methods of performance with materials at hand. Training that would develop such abilities had to deal with and to very closely imitate actual situations in the service. In place of the exercise method real jobs were assigned which in addition to developing principles served in the manufacture or repair of a useful product. In the auto mechanics courses the men did light and general repair work on trucks and pleasure cars belonging to local owners. In some instances contracts were made by the Training Detachment with local wholesale and retail merchantile concerns to keep their trucks in repair for merely the cost of the new parts. In other instances entire commercial garages were chartered and operated for training purposes. In the carpenters' courses the men built barracks, mess halls, red cross huts and bridges. In the machinists' courses machines were manufactured or munition work was done on a sub-contract from a local manufacturer. The horseshoers shod army and privately-owned mules and horses. In fact all of the courses which involved the work of converting raw materials into a finished product were operated on a production basis.

Next to the patriotic motive productive work contributed most to the morale of the soldier student. In the school reports over 60 per cent made a point of mentioning the great superiority of the productive job over the exercise as a shop activity. Thus it came about that the real product of the training detachments, soldier-mechanics, was greatly improved by emphasizing the importance of the material output of the training shops as a secondary product.

From the Report of University of Chicago, by Emery T. Filbey, Supervisor:

"In the machine shop, for example, work was drawn from two large manufacturing concerns. No charge was made for the work done. The school reserved the right to select from the work of the plant such work as could be done to advantage during a given training course, to complete the work whenever it could be done to advantage, and to assume no responsibility for wastage of materials beyond reasonable caution in the matter of organization and supervision of work. In other words the University was donating to the manufacturer the labor of a group of twenty men for the privilege of selecting work from stock production. The manufacturer saved in the item of labor and was quite willing to cart supplies both ways and when desired. The University saved on the item of materials and the men gained in variety and reality of work undertaken. As a matter of fact very little material, in fact almost none at all, was wasted and the manufacturers were more than pleased with the scheme. The men had all of the real work they needed in just the right amount and variety. A charge for the work would in our judgment have complicated the situation and reduced the educational opportunity.

The installation of heating apparatus and ventilators in the barracks gave the sheet metal workers plenty of practical jobs. They are carrying their product from the shop to the barracks.



Sheet metal class at work at Oswego State Normal

A similar arrangement was made in connection with the work in Blacksmithing. Real jobs were found in abundance in the work connected with the preparation for Section A. S. A. T. C. In addition there were tools of all kinds needed in the various departments. A cooperative arrangement was also made with the South Park Association, whereby they sent to the shop in quantity tools for general dressing and repair. For example several dozen picks were sent in at one time. It was thought this arrangement would be especially good because it introduced the kind of general repair work that would probably be called for in service.

In the woodshops there was no end of rough carpenter work such as benches, tables and cases. The neighborhood responded and there was soon a demand for more back porches, sleeping porches, garages, coal sheds, etc., than could possibly be built.

On the whole, it was felt this practical work was the only kind of work that would introduce the men to the real job. The exercise could be and was used occasionally as a standard test, but it failed to give the men a grip on the real job situation. The exercise, or rather the practice work, did serve to round out the training and make possible a broader type of experience than could have been given in connection with the productive work alone, especially in the shops less fortune than the machine shop in connecting up with the broadest type of productive work. A hide bound policy of doing nothing but the productive job would have interferred materially with the free progress of the work made possible by a combination of the two types of work wherever and whenever such combinations seemed desirable."

From Report of Essex County Vocational Schools, by Robert O. Beebe.

"We were particularly fortunate in being located in a building which required a good deal of re-arranging and improvement and our Carpentry Department found excellent instructive value in tearing up petitions, walls and floors, and in constructing stairways, trussing up walls and reconstructing portions of the building. This department also constructed a frame building about twenty-five by fifty. The building is now standing and serves our purpose as a school for motor mechanics. A good deal of practice work was also done by this department, such as, the building of gun racks, vegetable bins, fences and window screens. The electrical department found the same opportunity for practical instruction in installation work by re-wiring the school building throughout and by wiring the new building for light and power. We were also fortunate in being able to secure good, substantial and well selected equipment for instruction in electrical theory. The Automobile Department, during its course, overhauled a large number of cars and engines for private individuals and in this work obtained practice of a kind that they would no doubt be called upon to perform in the army. This is also true of the Machine Department, which, in addition to turning out a quantity of tool posts for the Gould & Eberhardt Company of Newark, did a miscellaneous assortment of work for the Automobile Department in making up and machining special parts to replace broken and worn out parts on the automobiles which were being overhauled in that department."

A group of carpenters in the training detachment at Dickinson High School, Jersey City, reconstructing an ice box for the kitchen

Laying track in the yards of the Southern Pacific Railroads, University of Nevada

From the Report of University of Vermont, by Dean J. W. Votey.

"In all the courses possible, the men were placed on work of definite value and to a considerable extent along the lines they were to work after they left us. The work of our carpentry school may illustrate this. We are three miles from Fort Ethan Allen. The Quartermaster there requested our co-operation and assistance. We sent over by truck, squads of carpenters who spend the day on construction and repair work. This included the overhauling of barracks and mess shacks erected the previous year, the construction of canteen, a large carpenter shop and pigeon house. The men here worked in the army atmosphere surrounded by the soldiers of the Fort. This condition greatly stimulated their interest in their work. On our own premises, there were erected mess halls, coal bunkers, lumber sheds, a garage for our Signal Corps cars and a laboratory building for radio work. A large amount of inside work was done, such as fitting up administration offices, canteens, Y. M. C. A. rooms and Quartermaster's stock rooms. The blacksmith shop and the machine shop did all the repair work and furnished the new parts for the auto school. The auto school rebuilt cars and trucks and overhauled dozens of private cars."

From New Hampshire College, by C. E. Hewitt.

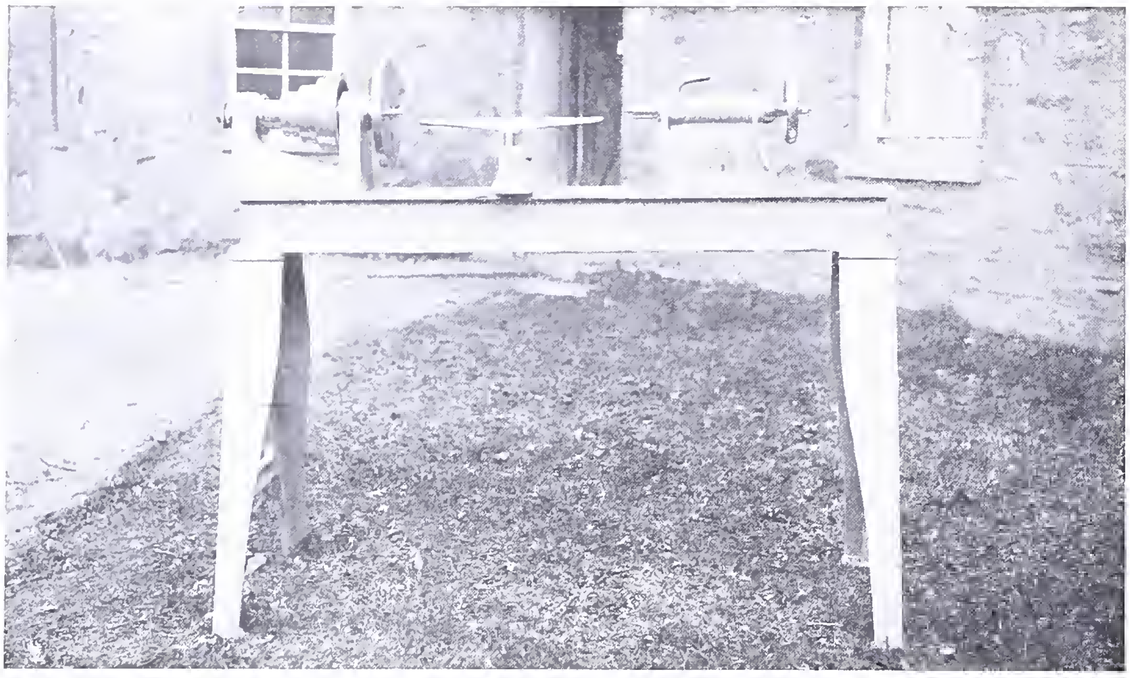
"The equipment owned by the Engineering Division of New Hampshire College was used to its limit during this instruction, but owing to the large number of men, additional equipment had to be procured, including tools of various sizes, certain additional apparatus and machinery. At the very start a policy was established whereby the materials necessary for instruction should be used for something of permanent value. Therefore, several buildings were constructed by the carpenters. The concrete men built the foundation to the buildings, and also constructed the sidewalks, bridges, etc. All types of re-inforced concrete work were used in this branch of the work. The electricians wired several buildings in open knob and tube work, iron armored conduit, metal moulding work, etc., which involved most every type of wiring now in use. In the auto truck division the men repaired and overhauled nearly 200 cars and delivered them to the owners in first class condition. By organizing the work in this way the machinists were kept busy a good deal of the time in making parts for the various automobiles and auto trucks. The blacksmiths were kept busy in the same way in connection with the auto truck repairs as well as other forms of general repairs.

Extract from the report of the University of South Dakota, Vermillion, South Dakota, by Robert L. Slagle:

"Men take more interest in productive work than they do the mere laboratory exercises. The problem is to make productive work yield a systematic and all around training. We had too much of the productive work in some sections."

From the report of New York University at New York City by Dean Chas. H. Snow.

We tried to do as much productive work as possible. Our men seemed to respond better whenever they were set at something that could later be used."



Lathe built by students at New York University Training Detachment

Sheet metal products. Rochester Athenaeum and Mechanics Institute

From the report of the Polish National Alliance College, Cambridge Springs, Penn., by J. S. Kozacka and J. I. Harrington. Operated from July 1 to October 28, 1918, trained 766 men:

"Experience with the soldiers only strengthened the conviction that productive work is the only thing for practical instruction, though the size of the student body and the varied character of the trades taught made difficult the problem of securing jobs well adapted for the purpose of instruction for the institution was handicapped by small-town location. But when such jobs were obtained they were inspiring to the men for they like to see that something real is being done. It was found many times desirable to repeat work to obtain proficiency though, of course, it would not be justice to keep a man at a task which he could do well simply to keep up the output. Here it seems that by avoiding rush jobs, that by selecting only jobs suitable for training, the atmosphere of a real plan can be created in the school. Where this is true real experience is obtained and real training given."

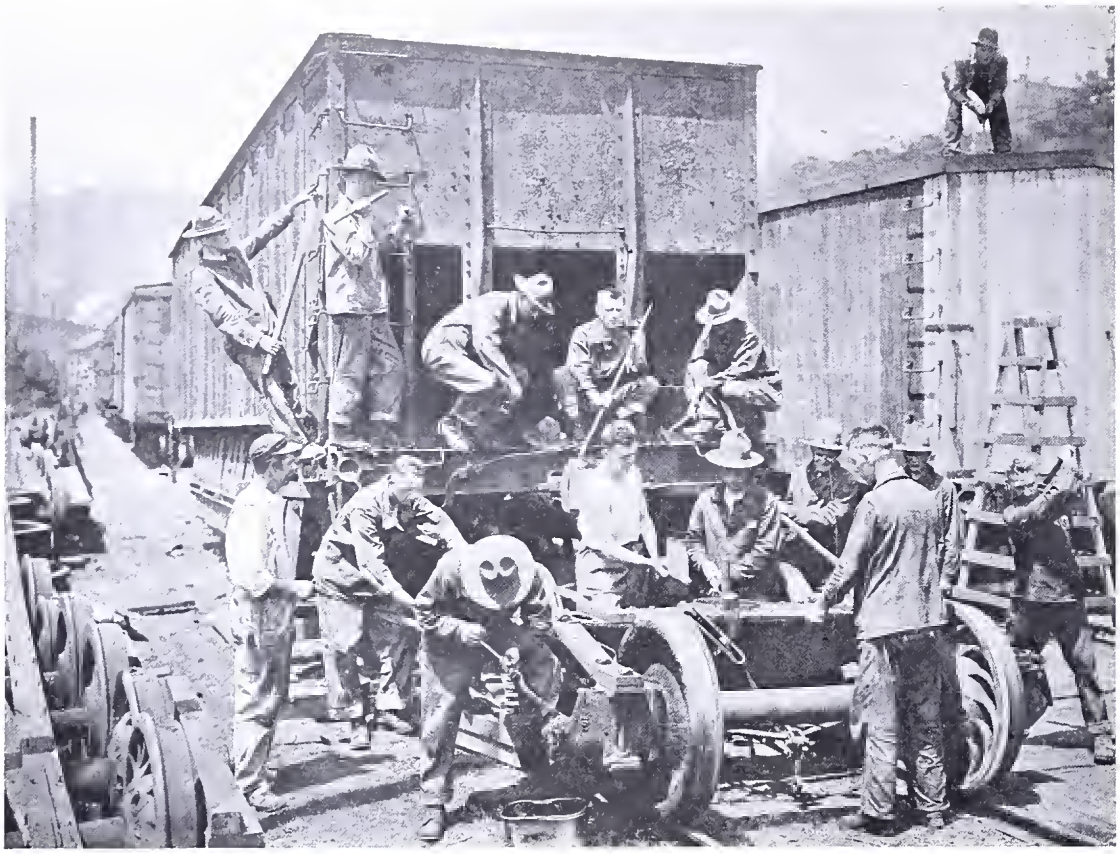
From the report of the Normal and Industrial Department, Wilberforce, Ohio, by William A. Joiner. Operated from July 13 to December 21, 1918, trained 386 men:

"The types of operations in the various courses were what might be classed as productive or commercial. The product consisted of sheds, barns, houses, garages, building repairs and roofing, interior building work, furniture repairs, construction of concrete forms and mixing of concrete; finishing parts for manufacturers; shoe repairing in all grades; auto repairs and re-building; horse-shoeing and forge work for wagons, and tool making. As far as practicable, work was done from drawings. It was found best to give lectures, amidst or after operations, in view of the almost entire unacquaintance with the work by the most of the men.

Productive commercial operations, selected as to ease and simplicity of principles, increasing gradually in complexity and difficulty as the student advances, are the only operations practicable in an intensive course where theory is reduced to a minimum."

From report of Michigan University, by H. H. Higbie:

"Colleges and schools are without doubt indebted to the War Department's Committee to a greater extent than can yet be appraised, rather more for a new and larger vision of education which they have opened up than for any contribution of pedagogical methods which they have made. Schools were permitted, wisely we think, to work out the details of their problems, and were encouraged to exercise initiative in developing the vocational training, while the Committee prescribed general principles and exercised restraints against excess and carelessness. It would probably have been better if visits of District Directors had been more frequent and fully devoted to giving information than to gathering it, but it is realized that the rapid growth of the organization and the tremendous business and routine involved probably precluded this."



A training detachment at Cincinnati Public Schools getting ready for work on the U. S. railroads in France

Now and then agriculture got a helping hand. A soldier horseshoer on the job at Colorado Agricultural College.

COOPERATION WITH INDUSTRIES

The fact that a number of colleges did not possess shop equipment did not deter them from engaging in the training program. Many presidents of such colleges in their eagerness to serve, immediately enlisted the interest of representatives of local industries and establishd cooperative relation for the training of soldier mechanics. In nearly every case their efforts were met with a cheerful response and the industries not only opened their doors to the project but felt proud of the greater service in helping the country in this crisis. They liberally offered equipment, their best mechanics for instructors, and material to work with. The presence of soldiers in these shops added zest to the efforts of the foremen and workmen, and it was not uncommon to see the foremen and even the workmen assisting in the instruction.

It might be said in passing that it would have been impossible to give some of these courses such as locomotive driving and repairing in any manner other than on the cooperative basis. The officers of the educational institutions deserve a very high commendation for the resourcefulness displayed in successfully utilizing the industrial resources of the locality in their efforts to meet to the fullest extent the program of the Committee.

All of these cooperative courses operated very satisfactorily. The training at all times was under the supervision and control of the educational supervisor, whose duty it was to plan and organize the course to the end that all of the time devoted to work in these shops was of an educational nature and developed the type of mechanics desired by the army.

At the University of Akron a course was given for tire repairing in cooperation with the following local tire manufacturers; B. F. Goodrich Co., Goodyear Tire Co., Firestone Tire Co., and Miller Tire Co.

At LaFayette College a course was given for locomotive repairmen in the shops of the Lehigh Valley railroad.

At Franklin Union auto mechanics were taught in a local commercial garage, operated by the Warren Avenue Garage Company, Warren Avenue, Boston, Mass.

At Lehigh University four different courses were operated in cooperation with local industries. A list of these is given in the extract from the final report, page 113.

In some instances all of the educational work was given in the industry. The soldiers reporting to the institution only for military instruction, mess and taps. In other instances part of the educational work was given in the industries and part at the institution. Furthermore, at some Training Detachments, courses were operated with an instruction staff of expert mechanics donated to the institution, while at other plants, machines, tools, and even material was either donated or lent for training purposes.

It is impossible to include in this report a mention of all the cases of co-operative effort for nearly every Training Detachment received in some form or other assistance from outside sources. It is in order, however, to mention the deserved recognition and appreciation of the genuinely patriotic, unselfish and wholehearted devotion of the officers of the educational institutions, of the representatives of the industrial concerns, and of the people of the communities where Training Detachments were established.

From Report of University of Nevada, by President Walter E. Clark:

"As a unique and usual feature of the schools in District No. 11, the arrangement between the University of Nevada at Reno and the Southern Pacific Railroad Shops at Sparks stands out as deserving of commendation. The Railroad Shops at Sparks are about three miles from the University Campus, where are situated the barracks of the S. A. T. C. An arrangement was perfected by which students of Section B received five and one-half hours daily instruction in practical work at the shops, arriving at eight o'clock in the morning and leaving at half past two in the afternoon with the one hour for dinner."

The work and instruction at the railroad shops was grouped as follows:

1. Locomotive repairing and rebuilding.
   - (a) Erecting the floor—Dismantling and assembling locomotives for repairs and overhauling.
   - (b) Roundhouse—Inspecting and making minor repairs with locomotives under steam pressure.
   - (c) Machine shop—Turning wheels and rims to fit, making new drive rods and other parts necessary for making complete repairs.
   - (d) Pipe shop—Installing air and steam piping including necessary acetylene welding.
   - (e) Blacksmith shop—Forging of parts, acetylene welding and tool dressing.
   - (f) Electrical shop—Repairing locomotive generators and head lights, car generators, storage batteries and shop motors.
   - (g) Paint shop—Painting of locomotive cabs and other parts.
   - (h) Boiler shop—Repairing and building of boilers, principal operations those of "Rolling" of tubes and riveting.
   - (i) Copper and sheet metal shop—Bending, shaping and brazing copper tubes, making copper gaskets and all sheet metal work in connection with locomotive overhauling.
   - (j) Air brake department—Inspecting, testing and repairing of air brake apparatus, principally brake valves and triple valves.
   - (k) Carpentry shop—Building of wooden cabs and other wooden parts used on locomotives.
   - (l) Store room—Commercial shop methods in receiving and dispensing of large quantities of raw materials and parts for use in various shops.
2. Car inspecting and repairing.
   - (a) Terminal inspection of train equipment and minor repairs—
     - (1) Wheels.
     - (2) Brake shoes and brake equipment.

    - (3) Axles, boxes and bearings.
    - (4) Couplers.
    - (5) Steampiping.
    - (6) Electrical equipment.
    - (7) Gas lighting systems.
  - (b) Shop repairs to cars when serious enough to be cut out from trains.
- 3. Track laying and repairs.

The students participated in every operation connected with the repairing and rebuilding of locomotives, cars and tracks and under commercial conditions in which time elements were all important. The students worked as regular apprentices or journeymen according to respective abilities, doing the same kind of work and under the same conditions as regular employees.

The equipment is complete. It could not be otherwise, which should be evident by accompanying photographs. There is no stinting of tools or equipment.

The teaching methods may be described as follows: Each sub-group indicated by a, b, or c, in the outline was in charge of a foreman who acted as instructor. The foremen kept close check on individual students and gave individual instruction as required. While group instruction may have resulted in a saving of time to the instructor, the same was not done in all groups on account of shop noise in general. The zealousness of most instructors to inform students of every phase of the work probably permitted of but few omissions. A student remained in one sub-group until thoroughly familiar and expert with every operation and process involved in that particular craft. As a general rule students remained in the same sub-group the entire eight weeks, but in a few cases where students developed as experts in less time, they were transferred to other sub-groups and given chances to learn other things.

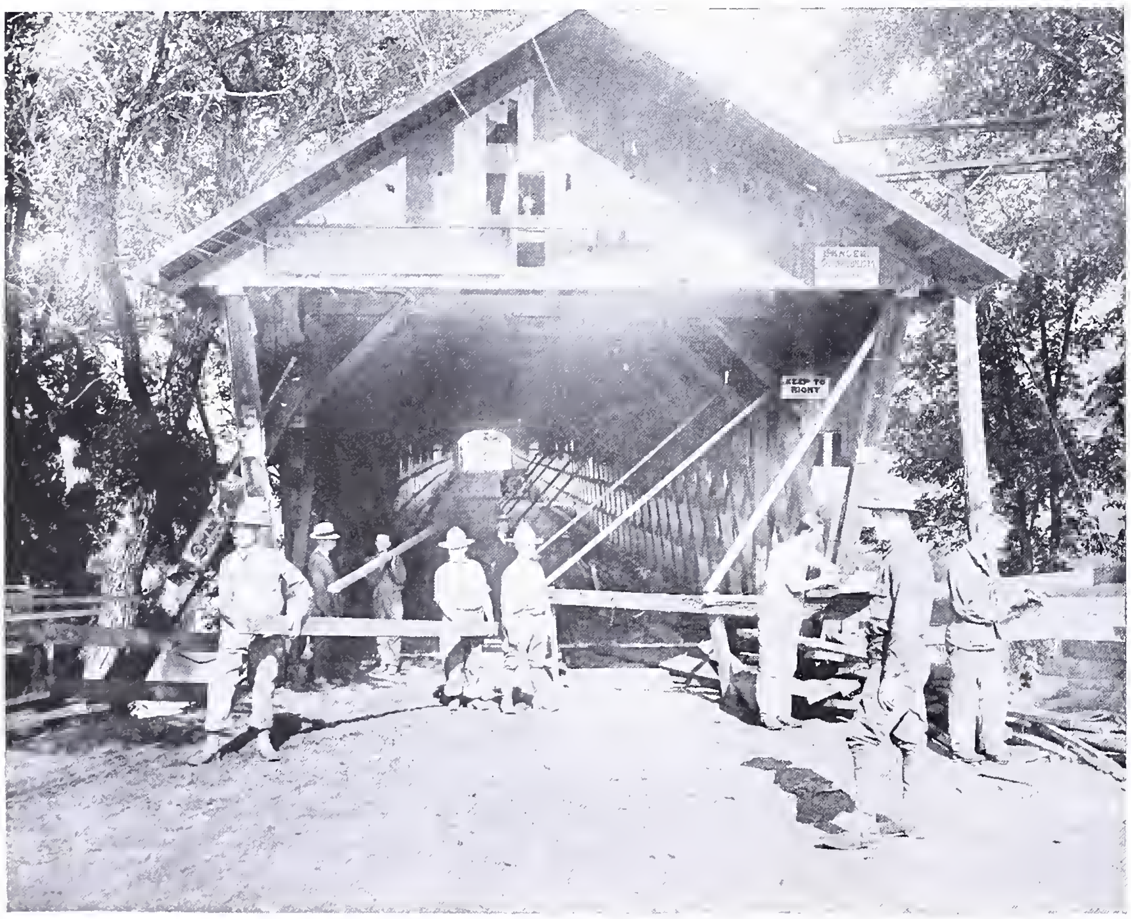
A member of the engineering faculty of the University of Nevada, who had four years' experience in railroad shops, devoted his entire time to the supervision of the work and the instruction. He kept a weekly individual record of the progress of 151 students. By means of special printed class record cards, he could tell right up to date what work a given student had done, number of hours to each process or operation, and his proficiency. At the end of the eight weeks he was able to report not only in terms of excellent, good or fair or expert, journeyman or apprentice, but actually everything that had been accomplished by students, together with ratings of proficiency and attitude at all times. Each instructor kept daily individual records of students.

The kind of work and the instruction was under conditions that might have obtained somewhere in France. The work was practical because done under practical and real working conditions. It was because it was the real thing. Under this plan with the war motive many students learned and accomplished as much in two months as ordinarily attained in five or six."

From the Report of Lehigh University, by Henry S. Drinker.

"The regular laboratories of the University were used. Instruction in locomotive engineering was given in the Air Brake Instruction Car of the Philadelphia and Reading Railway Company, the use of which was furnished through the hearty cooperation of the officials of that company. There was

The army carpenter may be called upon to build almost anything of wood. A detachment of the Cincinnati Public Schools is about to launch the newly made barge.

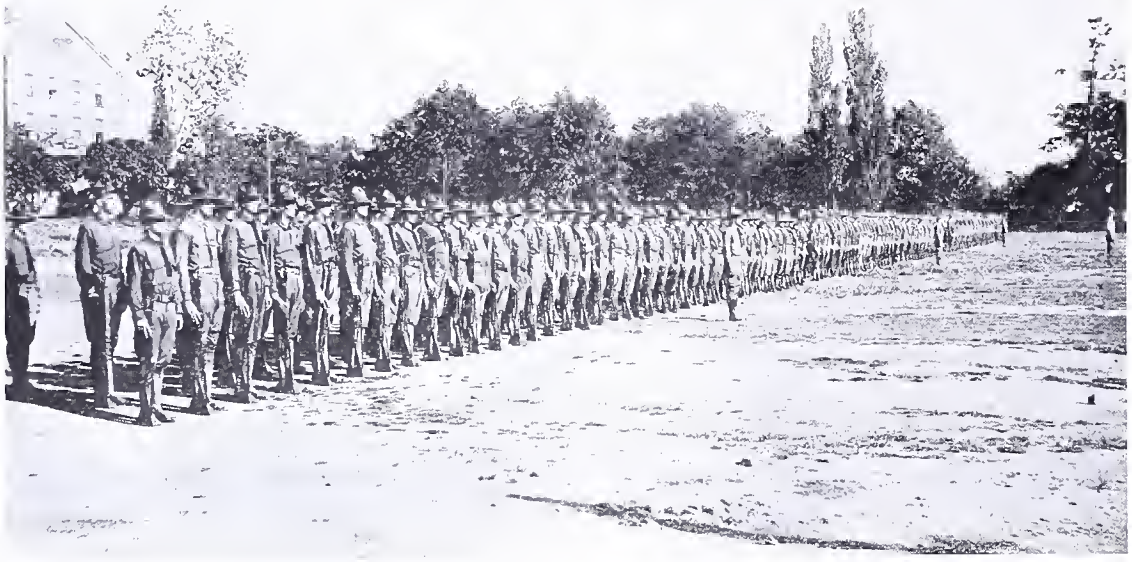


A Dartmouth college detachment is retimbering a bridge over the Connecticut River also in use a locomotive of the same design as those used in France by the American Expeditionary Force, likewise furnished by the Philadelphia and Reading Railway Company. Instruction in battery mechanics was given in the shops of the Bethlehem Steel Company. Practical instruction in railway track work was made possible through the courtesy and cooperation of the Lehigh Valley Railroad Company. Students in electric trades made use of the repair shops of the Lehigh Valley Transit Company and of local storage battery repair shops."

From the Report of Municipal University of Akron, by Dean Fred A Ayer:

"The director of the vocational section and the commandant made regular visits to the factories and the director was in charge of all instruction. Each factory had a man at the head of the school who was experienced in that kind of work, having had charge of the instruction of tire repair men for at least five years."

A group of battery mechanics of the Lehigh University Training Detachment trimming up the breach block and recoil mechanism of a 75-mm. gun in the Bethlehem Steel Co.'s shops where they are receiving their training



Three companies of the University of Georgia Training Detachment

Auto mechanics' school. Memorial day parade, Purdue University.

COMBINED MILITARY AND VOCATIONAL TRAINING

The experiment of producing soldier mechanics by a combination of military and vocational training was unique in several important particulars. From the military point of view it was a wide variation from the practice at the cantonments to devote only three hours a day to military training. On the school side, it was unusual to conduct the work under military discipline and also the method of treating the subject by jobs and projects instead of set exercises was new. The schools were therefore confronted with the double problem of securing and organizing a teaching force capable of administering a new type of vocational education and of coordinating this instruction with the military regime. Success required a clear cut understanding of the end to be secured on the part of both the military and the school authorities and a cordial cooperation between the two in every detail of the undertaking.

The results obtained by the new form of vocational training are treated on page 175. That the military discipline and routine were also large factors in the success of the experiment is indicated by the fact that out of 130 reports received from school supervisors only 9 regard the combination as unfortunate, 76 are enthusiastically in favor of retaining it and 45 are neutral in their comments. When the novelty of the experiment is considered and the large number of perplexing details that had to be solved are taken into consideration, this result is a striking testimony to the liberality and the devotion of both the military and the academic authorities. The following are some of the characteristic letters on both sides of the question:

From the report of the Brown University, by W. H. P. Fauce. Operated from May 16 to September 19, 1918, trained 302 men:

"The good effect of military training and discipline upon the quality of the work was not noticeable and real incentive would have been of much more value."

From the report of the Indiana University, by Arthur L. Foley. Operated from September 1 to December 21, 1918, trained 330 men:

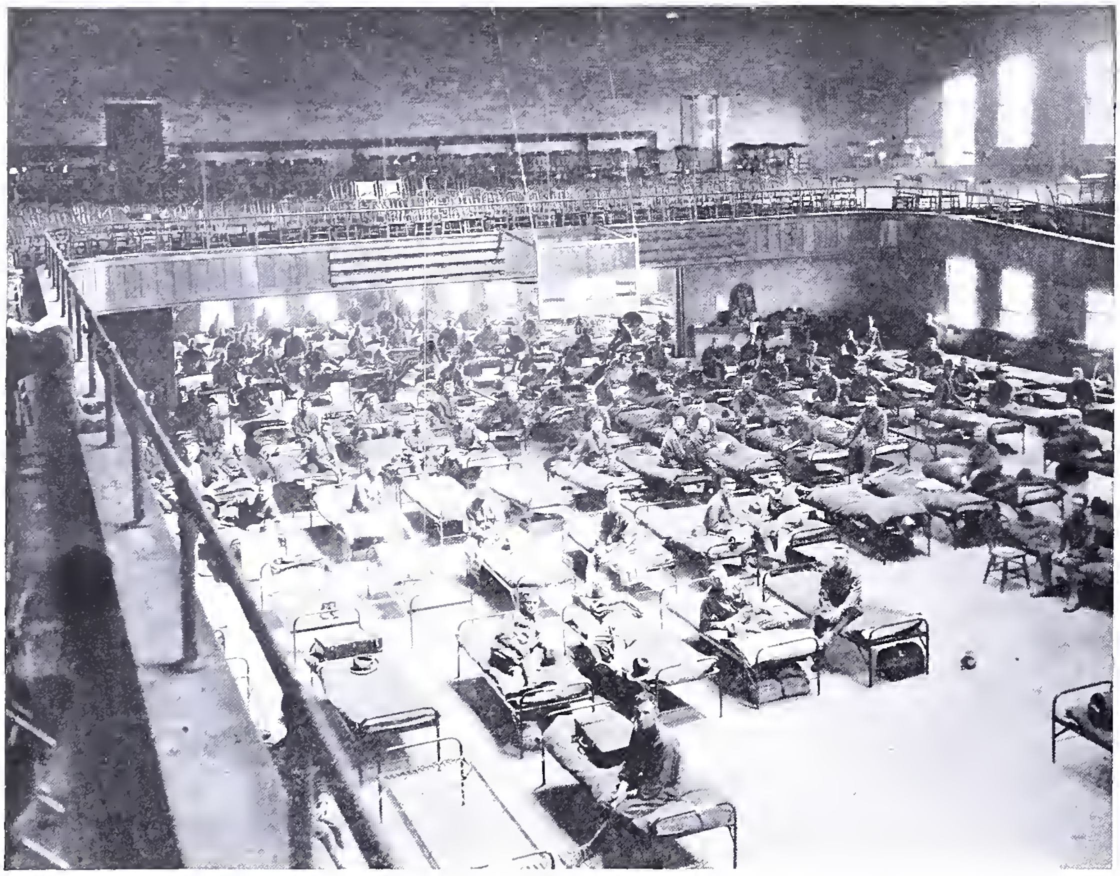
"The effect of military training and discipline as carried out at Indiana University was most disastrous upon the work of the students.

It occurs to me that vocational and military training might be made to go hand in hand and possibly help in the development of a higher ideal of life. However, as combined in the S. A. T. C. movement I think the effect was rather the opposite."

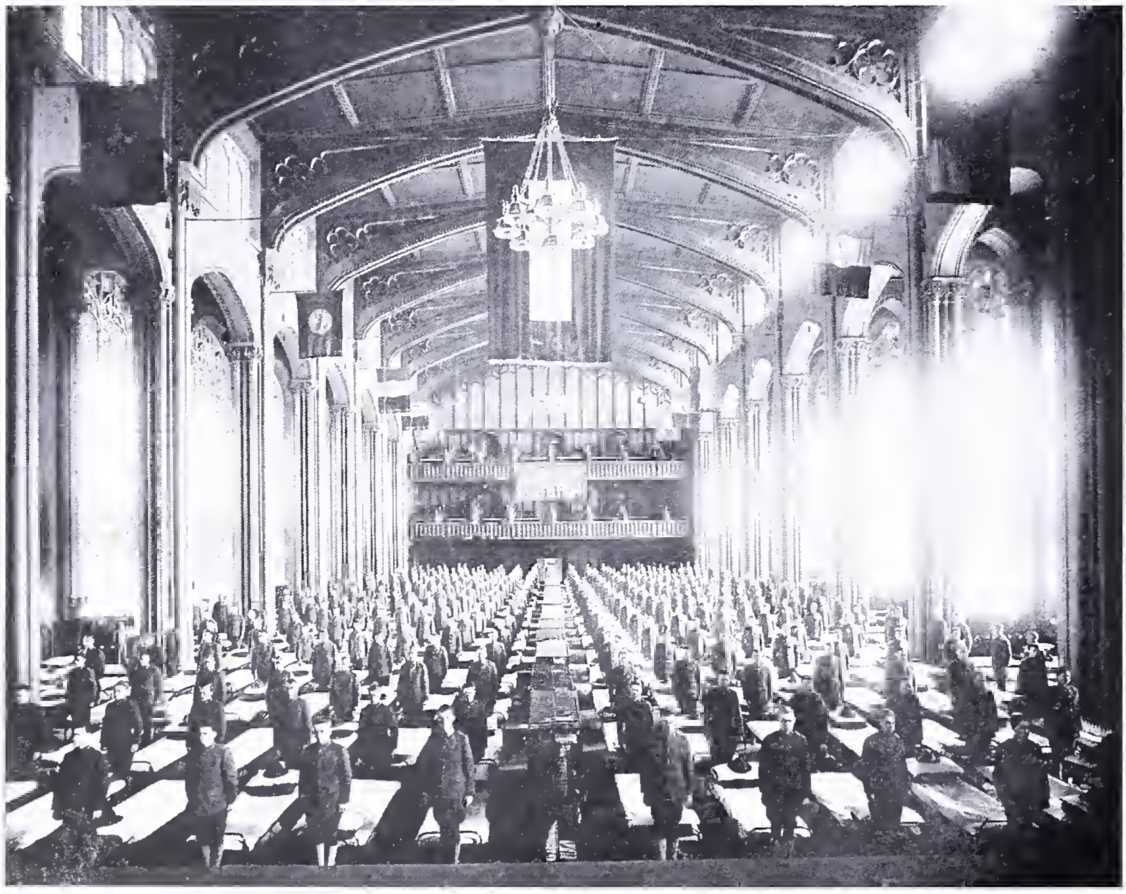
From the report of the University of Oklahoma, Norman, Okla., by Stratton D. Brooks. Operated from June 15 to December 21, trained 510 men:

"The general effect of military training and discipline on the quality of work was detrimental. I feel confident that the men would have done more work and better work if they had not been under military discipline.

The general effect upon military training and upon ideals of life has in



Quartered in armory. University of Minnesota.



Inspection of quarters in Great Hall. College of the City of New York.

this institution been detrimental. Our standards of conduct and character and ideals of service were better before the establishment of the Students' Army Training Corps than they were during the maintenance of the Students' Army Training Corps here. This is due to the fact that our ideal and aim is to make each individual of the University self-determined and capable of self-control in all matters affecting conduct and character. Such an attitude and ideal is naturally impossible in connection with absolute military discipline."

From the report of the Lafayette College, by D. B. Prentice. Operated from June 15 to December 6, 1918, trained 1,241 men:

"The effect of military discipline and training on the course work of the men was not evident. Those men who developed the greatest interest in their work did not do so because of the military training or discipline, but because of ambition to advance or because of a desire to be of additional value to the service. In so far, of course as military discipline inculcated this ambition to advance or to be of service, it was of value. The military officers showed very little interest in the educational work and seldom visited the shops except upon specific request to assist in discipline."

From the report of the University of Nevada, by President Walter E. Clark. Operated from June 15 to December 12, 1918, trained 418 men:

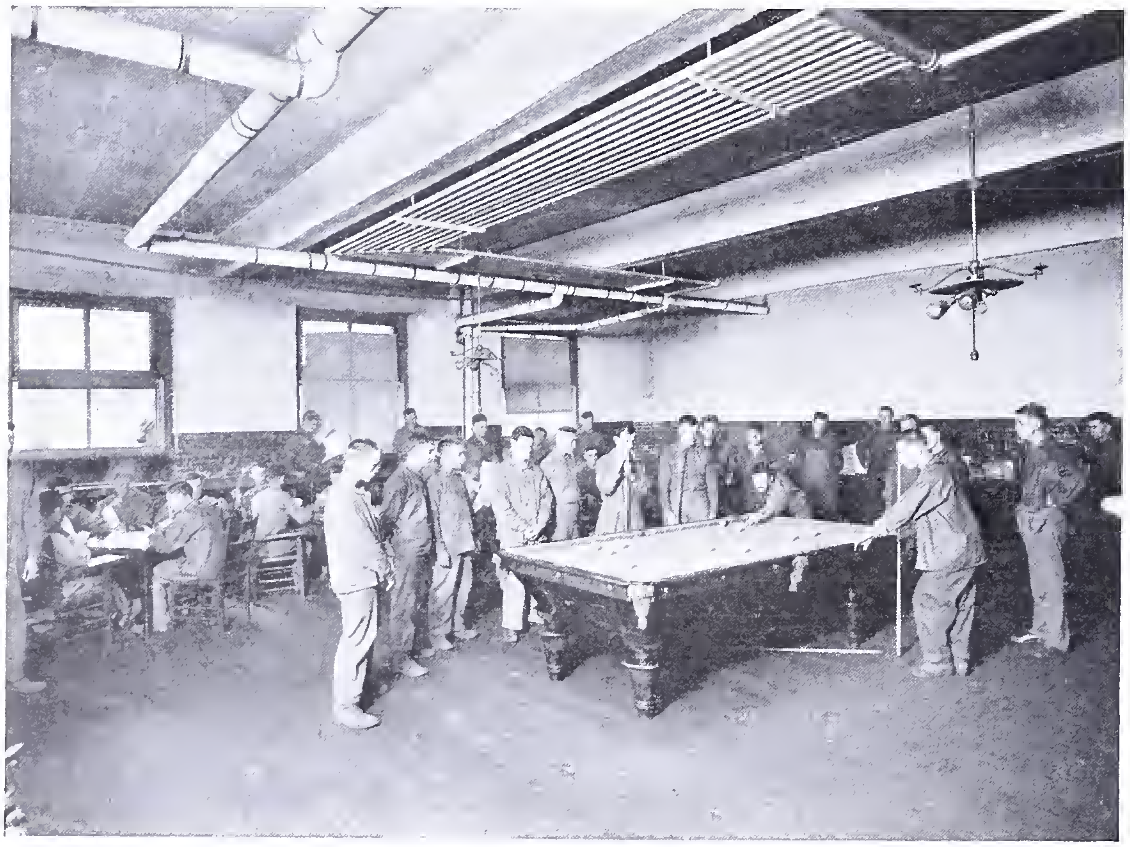
"The net effect of the military training and discipline so far as it could fairly be gauged by the experience of this University, was not favorable to efficiency in work in the mechanical training lines. The rigidness of the discipline and the strenuousness of the actual drill work during the military periods of the day, had a tendency to lead the soldiers to slack somewhat during their hours in the regular class work. This is probably neither a matter of blame on the soldiers nor the military instructors. It is a normal outcome of a very strenuous program as a whole when all parties concerned had clearly in mind that the major need of the program was to make civilians into soldiers.

For war purposes the combination of vocational and military training is doubtless very effective in the development of enthusiasm and the power in the soldier necessary to make him a mobile and effective fighting unit. It is fairly to be doubted that any such contribution is made to the right ideals for the peace life of the nation through the combination of military training with other vocational training when the military regime has full sway."

From the report of the Cornell University, by Dexter S. Kimball. Operated from June 15 to December 15, 1918, trained 1,066 men:

"It is difficult to estimate the effect of military training upon the work of these men. This discipline did of course keep them orderly and well-behaved. There was very little trouble of a personal kind and the relations between the teachers and soldiers was cordial and pleasant. The majority of them appeared anxious to learn. On the other hand the life of a soldier is an arduous one physically and the great amount of physical exercise, drill, etc. required of them takes considerable exertion which must detract somewhat from their ability to do their best when working in the shops. It is not believed, therefore, that anything more was accomplished than could have

In spite of the hard days schedule of vocational and military work, they were never too tired to play



More play, Dickinson High School

been done with men who were not under military supervision provided the same immediate incentive could be held out to them as was held out to these soldier students. In fact it is probable that even better work could be done without military supervision if this incentive could be found. There seemed to be a disposition on the part of many of the men to relax during study and shop hours and the promptness required by military discipline was not so much in evidence in their shop work."

From the report of the Georgia School of Technology, by R. H. Lowdes. Operated from June 15 to December 6, 1918, trained 1,164 men:

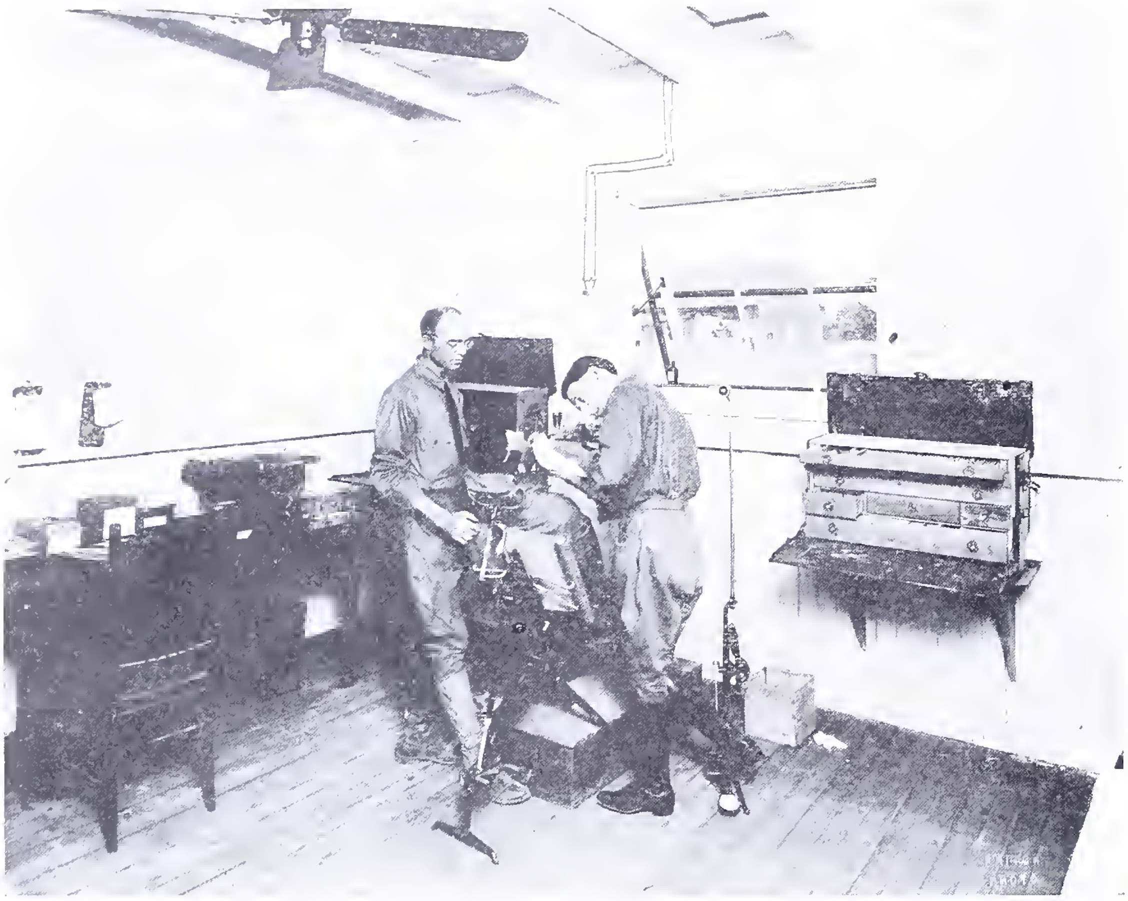
"With regard to the effect of military training and discipline upon the quality of the scholastic work of the S. A. T. C. students, we have had proved to us conclusively that the introduction of military training in the regular schools has proved a severe, but probably unavoidable handicap to all scholastic advancement. While this statement is true, it is in my opinion, but a paradox. The tremendously detrimental effect upon the scholarship of the S. A. T. C. students was due more to the revolutionary upheavals brought about in so little while, than to the mere introduction of military training."

From the report of the Michigan University, by H. H. Higbie. Operated from April 15 to December 30, 1918, trained 2,600 men:

"The effect of military training and discipline upon quality of work performed was quite pronounced, being in some respects advantageous and other respects unfavorable. It might have been expected to develop in the officers and men a spirit of devotion to the duties of the hour, but in this it was notably defective, for although six hours per day were prescribed to be given to the school work, few weeks passed without ten to twenty per cent of this time being usurped by duties which might better have been considered as part of the military training. Some data on this point is given by Secretary Allman in his report in this volume, and by Superintendent Goulding in regard to the school attendance of draftsmen.

On the other hand, the military features lent an atmosphere of deadly earnestness to the training which induced the men to work harder and accomplish more than they would otherwise have done, even without the threat of military penalties. The esprit de corps and rivalry between units of the organization, while not more pronounced than in traditional college life, seemed to be more easily directed to the end of doing better school work. While the manners of men in the presence of their officers and superiors in the school organization as well as the military were markedly improved by the military discipline, it was observed by women that their manners when outside of military restraint were if anything inferior to civilian standards. The men seemed to lose pride and sense of responsibility in themselves individually as they gained these attributes in respect to the military organization.

The reaction of the Vocational Training Section upon the University cannot yet be properly gauged. An indication of how it affects the non-technical man may be had by reading the editorials by J. R. Brumm (a Professor of Rhetoric) in the Michigan Alumnus, appended hereto as Exhibits G. and H. Quite generally at this University there is antagonostism to military control and authority, but appreciation of certain benefits to the educational organization acquired through association with the military system.



All in the day's work, dental clinic, Tulane University

War classes of enlisted men in sports on July 4. Pennsylvania State College.

In the future colleges will probably devise means to secure greater control over the habits of living and of work among their students, to the end that better health shall be maintained and less time wasted. It seems to be generally considered that, aside from its undoubtedly beneficial effects upon the students' habits of living, military ideals and military discipline are not as good as the schools' own ideals and discipline, except that the means of insisting upon observance of these are provided more effectively in the military than in the school organization."

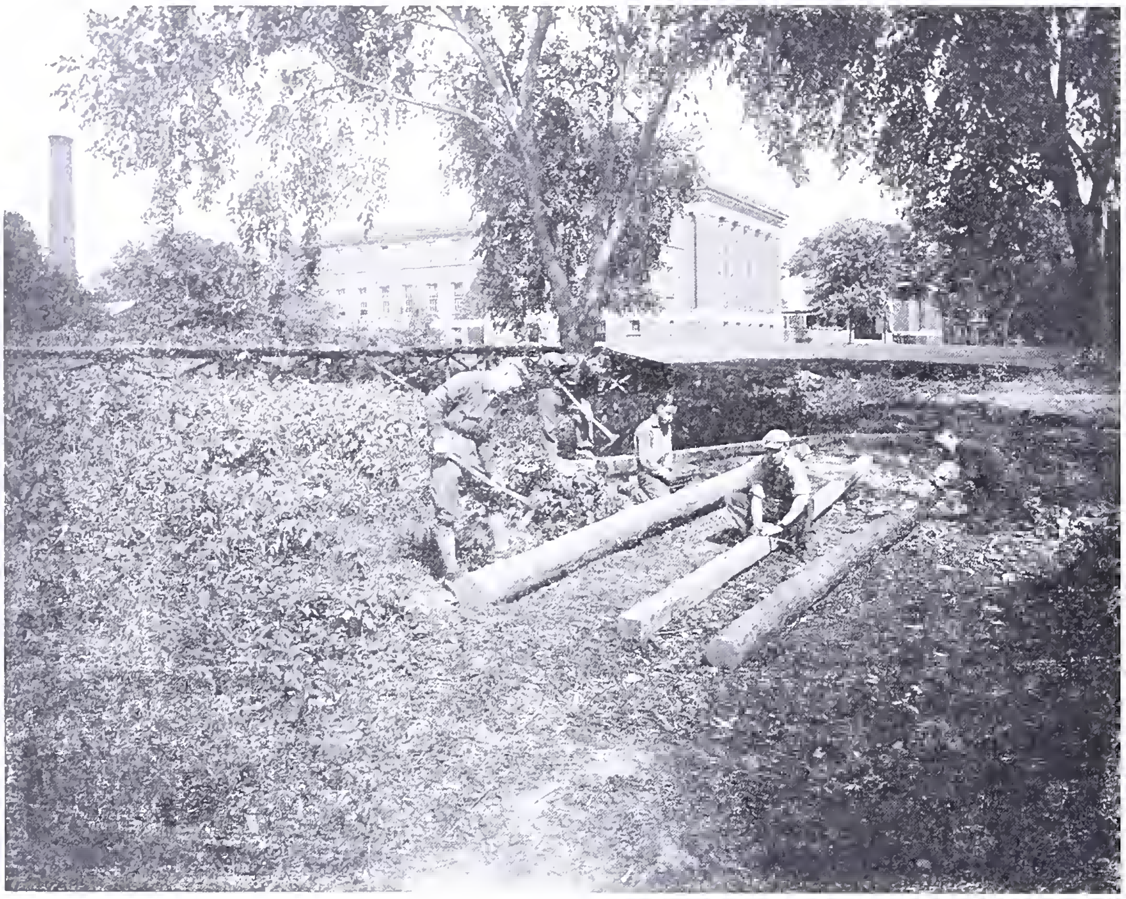
From the report of the University of Chicago, by Emery T. Filbey. Operated from April 10 to December 9, 1918, trained 598 men:

"There is no question about the value of combined military and vocational training as an aid to the development of Right Ideals of Life on the part of individuals who are brought into such training groups. Men were brought in who had enjoyed few advantages either educationally or socially. Contact with a group of men who had high ideals of life as well as of service was a real inspiration to such men. Their plans of living were elevated and their habits of living were revolutionized. On the other hand the detachment caught a relatively large number of wealthy young men who had never done a real day's work in their lives. It did these fellows good to receive no more and no less consideration than any other member of the group, to take their turn with the rest of the men in sweeping the shops at night, and to fall into line for the military part of the work. One lawyer who had enjoyed an income of some thousand dollars a month had a hard time settling down to the routine of carpentry and six hours hard work daily. He developed a grouch during the early days of the course and tried to talk the instructor out of the feeling that lawyers were not to be excused from the disagreeable work. He came out with some appreciation of what real service means. Another, a real estate dealer and club man, admitted that he had loafed on the job for a number of years, money came too easily and he had lost all sense of real values, wasted most of his time and had no real aim in life beyond having a good time. He made a splendid shaper man and did a day's work every day."

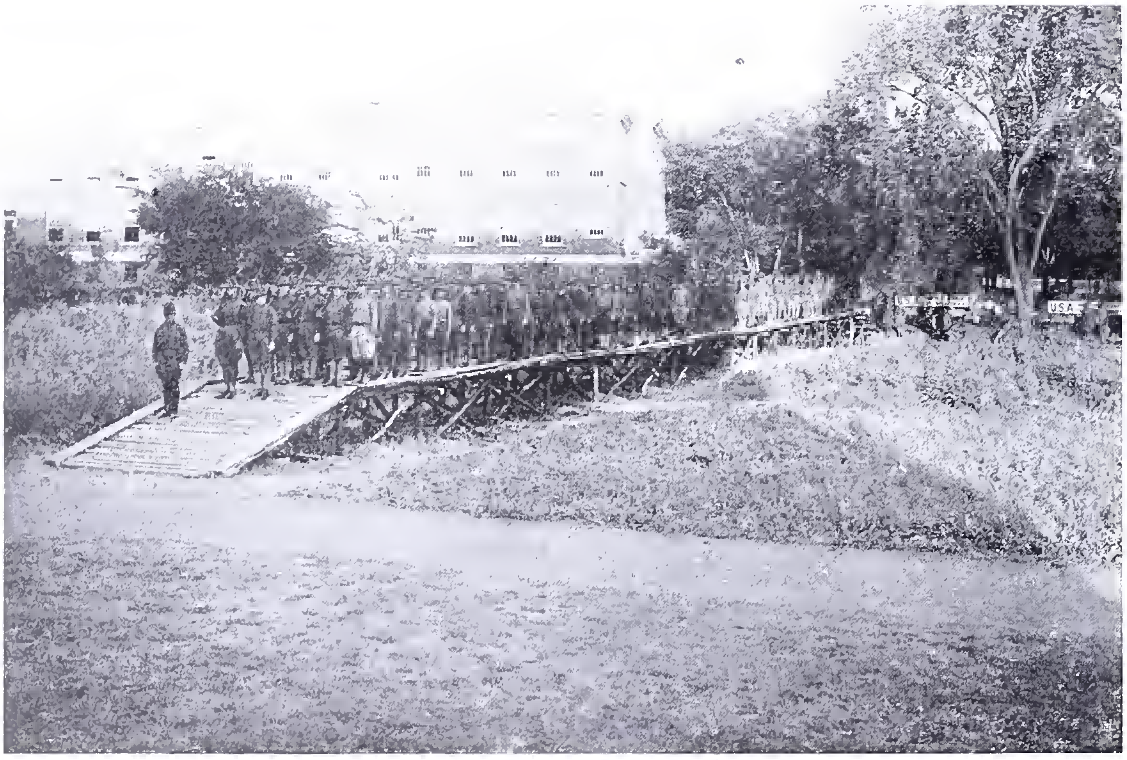
From the report of the Colorado Agricultural College, by Chas. A. Lory. Operated from June 15 to December 11, 1918, trained 714 men:

"In this intensive short course instruction, maturity of mind and vocational experience even though carried in a different line proves extremely advantageous. Men with disciplined minds are quick to acquire a good understanding of the principles of shop work and shop management. One fact, quite a surprise to us, is that vocational training in the industries compares favorably with high school training for mental discipline. It was quite surprising to us to find men without high school training, but having had three or four years of industrial training, carry the work in these short courses fully as effectively as college freshmen or sophomores.

Generally speaking, the effect of military training and discipline on the quality of the work is good. The best results require a sympathetic cooperation and understanding between the educational director and the commandant. Moreover, the quality of the military training is at once reflected in the attitude of the men towards their shop work. When the former is careless or



Building the Bridge.



Testing the bridge they made. New York State College for Teachers.

indifferent, it is hard to keep up a good spirit in the shop work. On the other hand, it is remarkable how quickly the men respond to good military conditions, by their increased interest and application to their shop work. We found that it was extremely difficult for some of the officers to get a clear understanding of the importance of shop work. It was the general disposition for them to take the men away from the shop work for military assignment, and naturally, this attitude was quickly reflected by the conduct of the men. Wherever sympathetic cooperation, based upon understanding of the purpose of the work, was had between the commandant and his staff, and the educational director and his staff, the results were excellent.

The combination of military and vocational training, both carried forward on high standards is in our opinion extremely effective in developing right ideals of life. The regularity and discipline of military drill, carried over into the shop with pride in skill, pride in production, and pride in good workmanship are powerful factors in developing right ideals of life and of conduct. It is a combination that should be used more in fitting our young men for their duties of citizenship and for earning their living.

Our experience with this vocational training has been so satisfactory that we are planning to continue it as a part of the work of the institution, carrying some of these into the regular technical engineering courses, and establishing a series of short courses in trade and industrial subjects."

From the report of the Technical High School of Springfield, Mass., by Charles F. Warner. Operated from July 15 to December 6, 1918, trained 252 men:

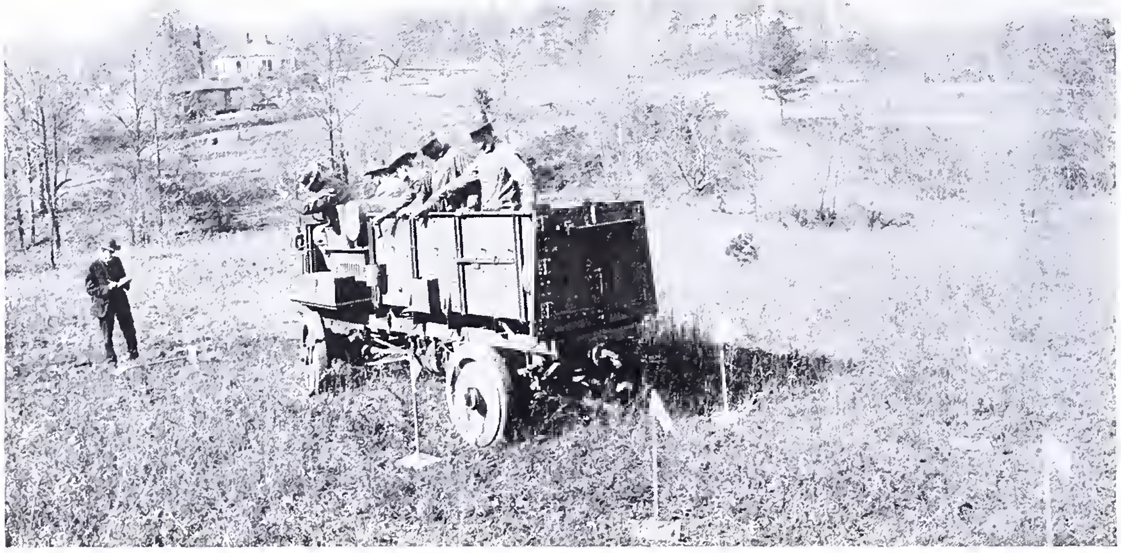
"The effect of the military training and discipline upon the quality of the work done by the students was noted by all the instructors and often referred to. Personally I believe there will be no question that the element of military training and discipline was of material assistance to the instructors. It is not easy, however, to specify just why this is so. Everyone easily recognized a certain courtesy which grew out of the military side of the training, a growing respect for authority, a willingness to give prompt attention to orders and directions, and a general toning up in manly bearing in classes and when off duty, as well as during the more formal military drill.

It is my opinion, from my observation throughout this whole experience, that a concentration of public attention upon the benefits of occupational skill as a national asset, without any military procedure whatever, would be a good thing for education in general. If the military element can also be added, with a view to making men not only "fit to fight" but, what is the same thing, fit to work, fit to live, fit to give their best service to the community in whatever capacity, I believe it would be the greatest single educational gain that this country has ever seen. If the experience of the army training schools could be fully appreciated and made available, the influence of these schools upon the educational and industrial interests of the country would be beneficial to a marked degree."

From the report of the Bradley Polytechnic Institute, Peoria, Illinois, by Albert F. Siepert. Operated from April 10 to December 14, 1918, trained 1,650 men:

"It was quite clear to all instructors in comparing the work of soldier students with civilian students that the former were superior as a class. Part of this is doubtless due to maturity of the men, more of it to a very definite aim. Each of the soldier students and the instructors knew they had a certain job to get ready for, that two months' training here was all that was available to make them ready for active service and so each one naturally put forth every effort to make good. Aside from all of these influences, a very considerable amount of credit must be given to the direct effect of military training and discipline. The regular hours of eating, sleeping and exercising in the open air gave a physical tone to the men that made the hardest tasks easy. Above all, the spirit of achievement, of directed energy radiating from the office of the commanding officer made the organization move with a snap and vigor unusual in civilian classes. The commanding officer made frequent, almost daily visits to the various classes to see the men at work, and the weekly reports of the instructors to the Educational Supervisor were made use of by the commanding officer in dealing with the men.

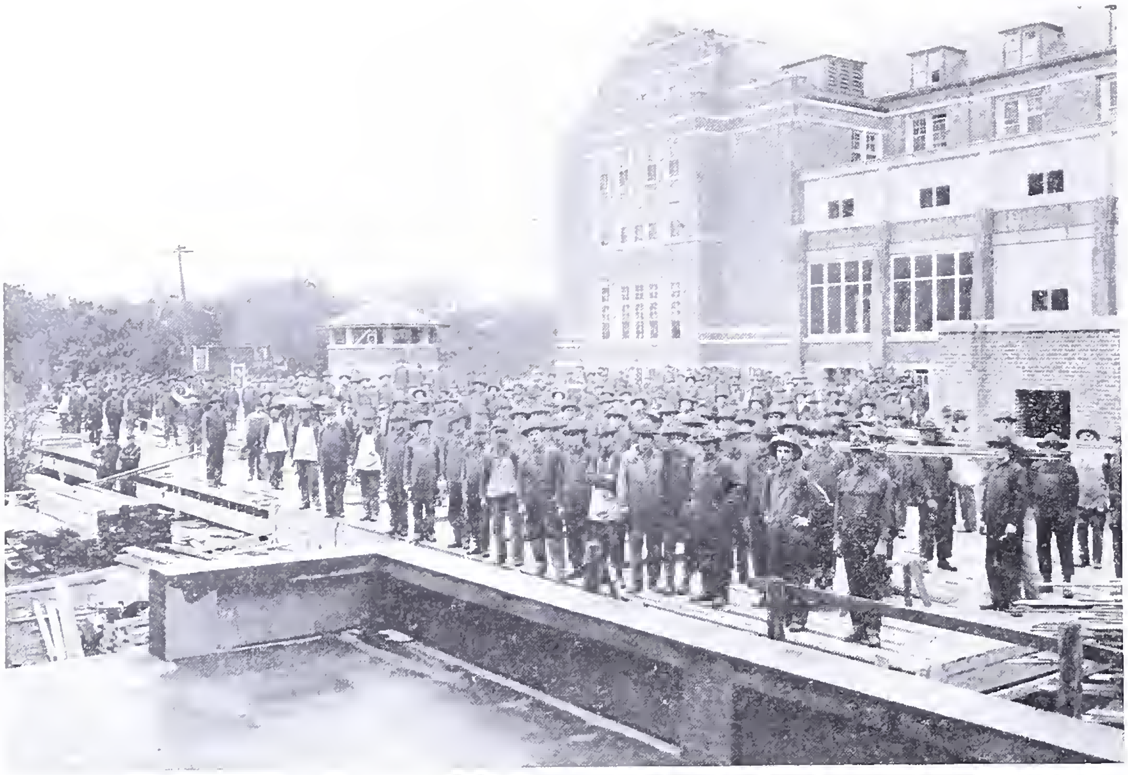
It has been a matter of great satisfaction to note how many men have caught the vision of a finer type of citizenship. Many found latent powers of leadership which the military discipline and vocational work brought to the surface. Instructors have told the writer of men coming to them at the end of a training period to thank them for what they had done for them to make them better men, and the number who spoke of the influence of the officers upon them was indeed large. Some of course seemed not to grow in right attitude, but that simply proves the exception to the rule."



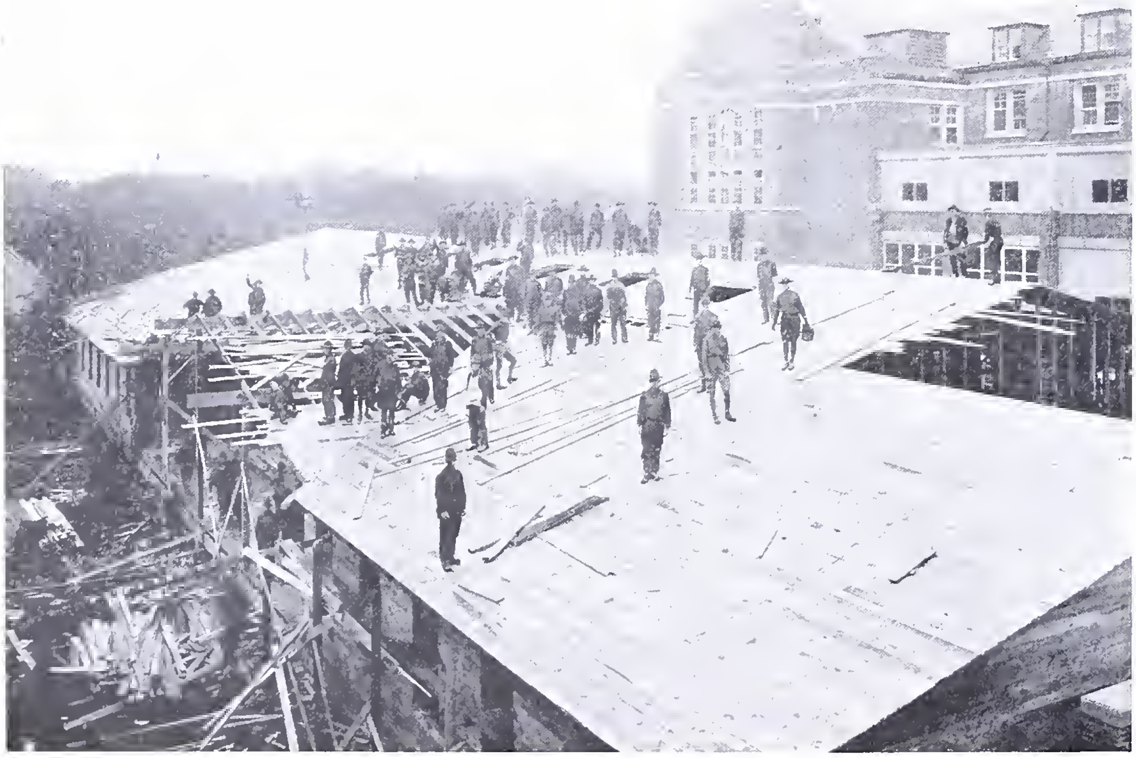
"Is buddie making good?"
The soldiers were interested in tests, Georgia School of Technology.

The mess hall at Texas University seated 3,200 men

Setting-up exercises at Columbia University Training Detachment



8:00 A. M.



5:15 P. M.
Building a mess hall in one day. University of Michigan Training Detachment.

OTHER PROBLEMS

No attempt has been made to give a typical cross-section of school life in this report. Of necessity, the inspiring story of each detachment cannot be recounted here. Each would have, if told, a chapter on the new and complex problems of feeding and housing the detachments. These problems were solved in each case in cooperation with the military officers. A chapter on general business management would be required. The visitation of the influenza epidemic stopped progress in many schools from two to six weeks. The generous aid and hospitality of the communities in which the detachments were stationed in meeting this and other emergencies, the cooperation of the Red Cross, the Y. M. C. A., the K. of C., and similar bodies must all remain the subject-matter of unwritten chapters.

At our entrance into the war, our schools faced the possible depletion of student body and equipment that many of the schools of our Allies suffered. In contrast, the effect of the war upon our school life and point of view is a topic upon which many supervisors dwell in their reports, and only four per cent of the reports received tell of their war-time training activities as an unfortunate experience for the school. Instead, the majority speak with satisfaction of the happy effect of the experience upon the future development of their institution, both materially and upon the educational outlook. Some of these comments follow.

Extract from the report of Carnegie Institute of Technology, Pittsburgh, Pa., by Dean C. B. Connelley:

"Of the reaction upon the institution of our war activities, a very definite and appreciative statement can be made. In the final checking up of accounts, we venture to predict that the colleges will shortly consider themselves the greater beneficiaries from the khaki days of 1918. They received more than they gave, in their brief association with the military regime. The soldiers were educating them quite as much as the reverse process. The benefits were many, ranging from so important a matter as a new insight into the problem of vocational guidance down to such an office detail as looking with favor on the military heading for letters, which, like all Gaul, is divided in three parts, "From—To—Subject." The life collegiate was quickened and vitalized. Instructors and officials were forced into doing things in a way entirely unorthodox and unacademic, and were surprised to find the results not half bad, in fact, very frequently, unexpectedly good. Under the right sort of pressure, certain educational miracles could be performed, after all. More direct methods of attack were discovered, corners were cut without wrecking the result, and knowledge was handed out in tabloid form beyond all tradition. And it worked, in the main. The men "got the stuff." Another lesson learned was the advantage of rating students on certain personal traits as well as on academic performances, as provided for in the army rating system. The colleges also became interested in the intelligence or phychological tests that were developed by the Committee on the Classification of Personnel, and are likely to adopt some of these in the near future. They were also forced into better administrative procedures to expedite their war business.

The student, too, is not to be forgotten in any record of benefits received. His preamble to you is now "Sir" instead of "Say"; his slouch has vanished for the time being, let us hope permanently, and he has acquired some adequate conception of respect for discipline and authority. His sense of social responsibility, his knowledge of personal hygiene and foreign geography, and his appreciation of what good citizenship means, have all been given a big boost. He now knows the essentiality of being physically fit. He knows a lot of modern European history, and of the background of the war, thanks to the course in War Aims, of which we thought so much as to have continued it in a modified form. And, to drop into lighter vein, he can sing a parody or two on "Keep Your Head Down, Fritzie Boy," in a fashion calculated to please the gods of war and some mortals. Altogether, the reaction on the college, the student and the community was one of the bright spots of the whole experience.

Another legacy from the experience will be its future offsets. You may imagine that 95,000 young men were not marched into the colleges and out again with nothing to show for it. They were all men, who in normal times, would never have seen a campus, much less have lived and worked on one. Short as their stay was, it was a unique contact for them, and an illuminating one. Never was the value of education so effectively brought to the attention of so large a group under such vital circumstances. Hundreds of them will continue their training, in one way or another, and thousands will see to it that their children get in full what they got only in part. Many who were in unskilled occupations, blind alley jobs, or underpaid clerical positions, will endeavor to profit by their start here and elsewhere, and work into fields requiring technical information and trained intelligence."

From the report of University of California, Berkeley, California, by Benjamin Wheeler:

"It is felt that the intensive courses given by the War Department during the past year have shown that more attention than necessary is being devoted to prerequisite courses in college curricula. The men in the different war courses have shown themselves capable of grasping the subject matter promptly without a number of introductory courses. On this account a query has been raised in several quarters as to whether too much time is not being devoted, especially in professional colleges, to the study of numerous so-called prerequisite courses."

From report of Kansas State Agricultural College, Manhattan, Kansas, by W. M. Jardine:

"One of the effects of the Vocational Training at this institution is going to be the changing of courses wherein many of the different subjects were taught, to more specialized courses. For instance in the special courses in shop work we previously gave each man some machine work, some blacksmithing, some foundry work, some carpentry, some drawing and some gas engine work. Now, however, we plan on giving courses for machinists who will take all their work in the machine shop, blacksmithing where the man will take all his work in the blacksmith shop, etc., and it will be an exception to the rule to give more than one line of work.

There is also going to be some re-action with respect to the regular professional engineering courses in that there will be certain practical engineering courses given in the Freshman year so that the students will come in personal contact with some of the things which they will consider from the theoretical standpoint later on. For instance the Freshman Mechanical Engineers will be given a practical course in steam and gas engine. The Electricians will have a practical course in electric work. The Civil Engineers will be given more surveying. This we believe will have a tendency to decrease the number of students who drop out in the Freshman year because of the excess of theoretical subjects which their experience does not fit them to appreciate."

From report of Tulane University, New Orleans, La., by A. B. Dinwiddie:

"It has convinced us that vocational training should be made a permanent feature of our educational system in the future. It should also be included as an essential part of a system of universal military training, if such a system should be adopted; that is, the young man who is under obligation to take military training should be allowed to take such training as a private or with a view to an officer's commission, or as a mechanic.

Our experience showed that the problem of dealing with the adult in vocational training is quite different from that of dealing with the high school student, and it is questionable whether the manual training school or the trade school which carries high school work is competent to train the adult. It seems probable that the college can by means of intensive vocational training courses solve the problem of training the adult unskilled workman better perhaps than it can be solved through any other medium.

The interest which the men showed in this work and the desire which it created in them for further and more advanced training indicates plainly that engineering colleges can profit greatly by introducing a certain amount of vocational training in the earlier years of the college course. The experience of the Vocational School brought out clearly the need of more logical and effective organization of the regular university work and indicates in some respects the methods by which such organization could be carried out."

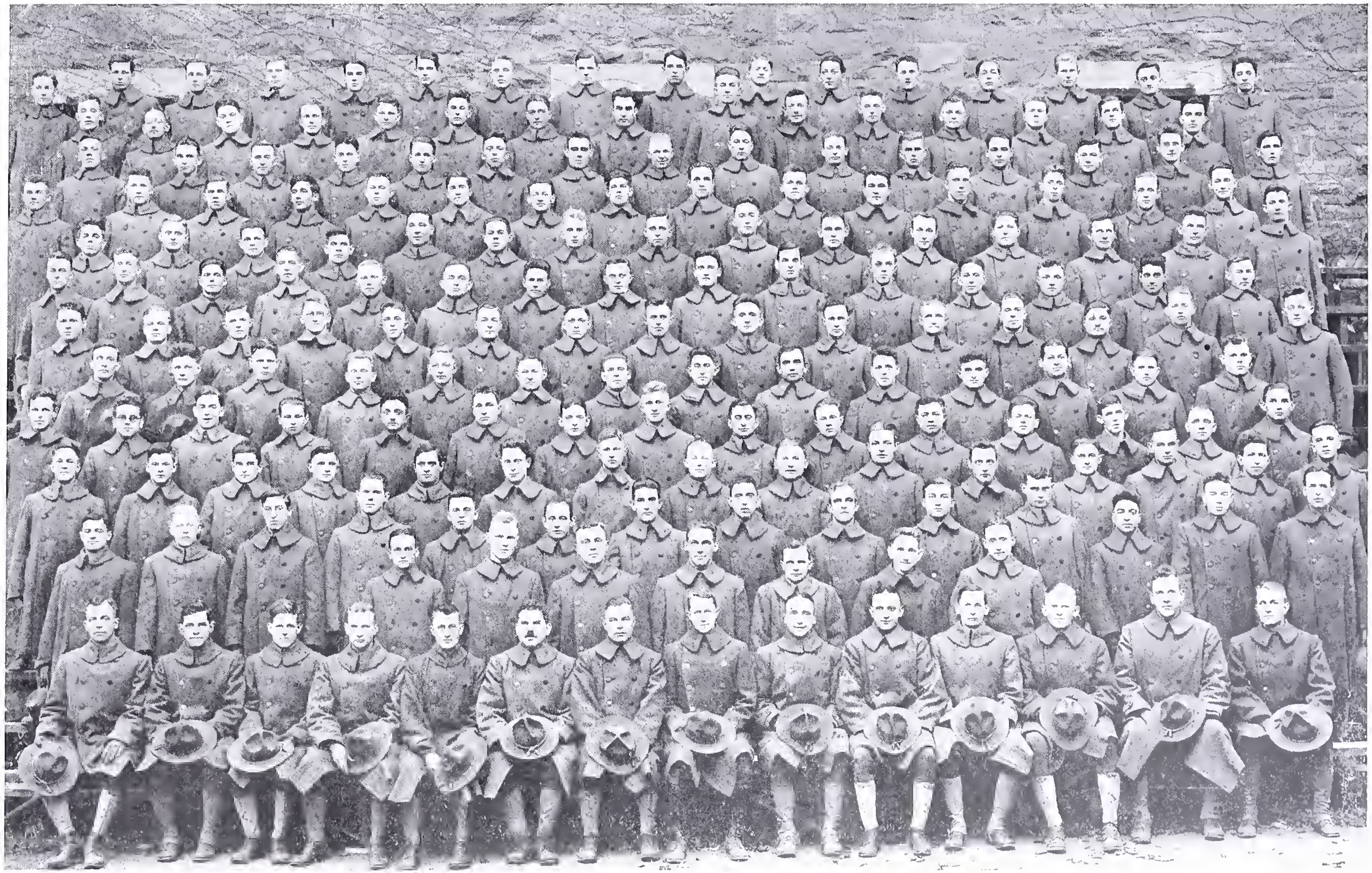
From report of South Dakota State College of Agriculture and Mechanic Arts, by H. B. Mathews, Brookings, S. D.:

"It seems possible that the tendency in education, at least for a few years to come, will be more of a vocational nature. There seems to be a fear on the part of some that it will tend to make trade schools of colleges and that there will be a tendency to give up college work and offer more and more of the vocational courses and consequently it will cut down on the number of students who wish to take the regular four-year courses and increase the number of students who will be in school for only a short time.

There is no question but that it is going to make the work of the institutions of the country more practical in character.

Some of this vocational work will be continued at the South Dakota State College in connection with other work. Some of it will be discontinued, for example, the radio operator's course. We have found, however, that the practical electrical work is of real value to the student taking the four-year course. It is of just as much value to the electrical engineer as machine shop work is in the course in mechanical engineering. For that reason practical electrical work will hereafter have a place in our regular electrical engineering course. Some of these practical lines such as blacksmithing, tractor work, etc., will be found in our agricultural courses. In South Dakota where farming is done on a large scale machinery plays an all-important part, and it is found that a good farmer today must be a good mechanic."

Airplane mechanic's class in a 4th of July parade of enlisted men. Pennsylvania State College Training Detachment.



Cornell University Training Detachment

PART III

ADMINISTRATION

SYSTEM

The magnitude of this industrial educational project and the mass of details involved, demanded an administrative system in the central office at Washington as comprehensive as that required by a large manufacturing concern. It was necessary to keep in very close touch with all the Army Corps to ascertain their requirements as to numbers of men and exact kinds of specialists needed. The required number of men to fill these requisitions had to be ordered to the various Training Detachments through the Provost Marshal's office at least three weeks in advance of the starting date of the training. Existing courses had to be expanded and new trade courses established to meet the increasing demands of the various corps. The training detachments had to be supervised constantly to insure adequate equipment, capable teaching staffs, effective methods of instruction and later modifications and additions had to be made to the courses to the end that the training would fit the men to function efficiently and immediately when assigned to the Army Corps upon graduation. Furthermore, accurate information had to be obtained from all the Training Detachments prior to the period of graduation concerning the number of men available, the certification of men according to the standard army specifications and trade symbols, the number of men available for officer's training camps, the men unsuited for the training, and men physically unfitted for regular service, etc.

Reports were received at regular intervals on especially designed forms which kept the central office constantly informed on the situation in the field. Specimen of these forms are printed on the succeeding pages.

By June first, the routine work of the office had gained such proportions that an office manager was employed to take full charge of statistics, reports, files, stenographic service, office equipment, etc. As time went on and the volume of the work increased, it became increasingly difficult to get help. Most of the office help was furnished through the Civil Service Commission, but many other channels were employed to bring such people from distant cities.

Summary—Winter Program

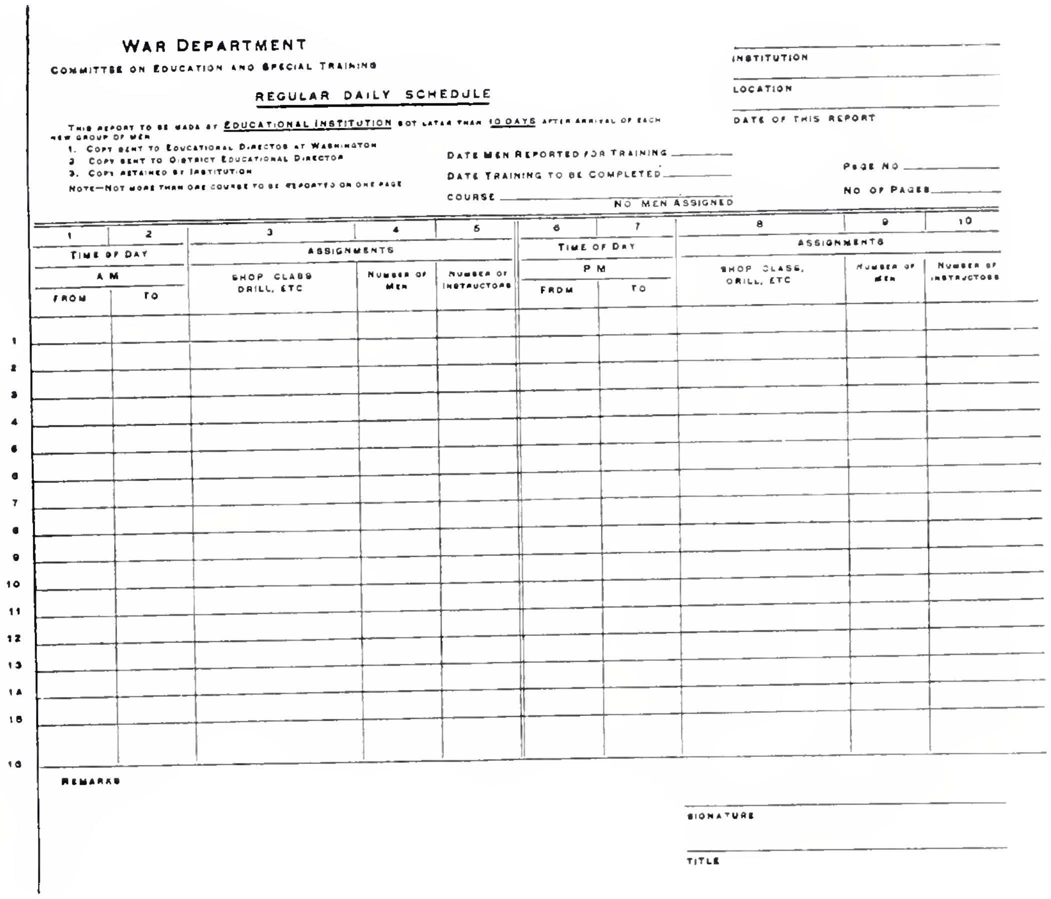
PRODUCTION—PROPOSED AND ACTUAL

Dates Shown Are Time When Men Complete Course

TRADE	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	TOTAL
Airplane Mechanics				100		100		100		100		400
Auto Drivers	1000	600	785	1290	785	1290	785	1290	785	1100		9710
Auto Mechanics	150	1548	11940	4285	12340	4185	12340	4185	12340	2845	90	66248
Automotive Engineers						250		250		250		750
Auto Truck Drivers, Heavy	290	830	1600	4500	4600	4500	4600	4500	4600	4500		34520
Band Musicians		100	450		450		450		450			1900
Blacksmiths	1022	400	860	359	860	359	860	359	860	168		6107
Carpenters	2175	1165	910	850	870	410	870	410	870	390	30	8950
Car Repairers	20	40	65	100	65	100	65	100	65	100		720
Chauffeurs		330	540	1040	1540	1040	1540	1040	1540	540		9150
Clerks and Stenographers	20		60		60		60		60			260
Cobblers		20		20		20		20				80
Company Mechanics				400		400		400		400		1600
Concrete Foremen	310	120	240	40	160	40	160	40	160	40		1310
Construction Foremen	25		25		25		25		25			125
Draftsmen, General			380		380		380		380			1520
Draftsmen, Topographical		40	810	265	790	245	790	245	790	175		4150
Electricians	1189	650	947	254	992	154	992	154	992	104	50	6478
Farriers			120	145	120	145	120	145	120	45		960
Signal Battalion Officers			300			300			300			900
Foundrymen		10	115	40	90	40	90	40	90	20		535
Gas Engine Men	581	385	240		240		240		240			1926
Gunsmiths	505	75	245	475	275	475	275	475	245	475		3520
Horseshoers	130	20	135	65	135	65	135	65	135	65		950
Ignition Workers			30	20	30	20	30	20	30	20		200
Instrument Repairmen	220	105	240	108	240	108	240	108	240	108		1717
Leather Workers			15		15		15		15			60
Lens Grinders	20		20		20		20		20			100
Locomotive Engineers	60		70	60	10	60	10	60	10	60		400
Locomotive Machinists	30		20		20		20		20			110
Machinists	872	277	925	399	895	399	895	399	895	319	60	6335
Mechanics, Battery				150		150		150		150		600
Mechanics, General	377	260	635	395	665	395	665	395	665	230		4682
Mechanics, Wagoners		40	260	60	260	60	260	60	260			1260
Meteorologists					150		150		150			450
Mine Drill Runners	240	60	200	130	200	130	200	130	200	130		1620
Motorcycle Repairmen	40	20	660	170	1360	170	1360	170	1360	50		5360
Motorcyclists	40			500	500	500	500	500	500	500		3540
Multiplex Telegraphers	300	300	300		300		300					1500
Pipe Fitters (Plumbers)		40	340	70	360	70	360	70	360	20		1690
Process Printers				40		40		40		40		160
Pattern Makers		8										8
Propeller Makers			140		140		140		140			560
Radio Electricians	135	55	500	1460	1750	1750	1810	1750	1750	1160	550	12670
Radio Operators	2174	1060	3485	2535	3470	2595	3470	2595	3470	1865	80	26799
Railroad Trackmen			65		65		65		65			260
Rubber Workers	110	110	205	110	205	110	205	110	205			1370
Sheet Metal Workers	455	340	300	318	300	318	300	318	300	318		3267
Surveyors			825	205	820	205	820	205	820	95		3995
Teachers' Training Course			150		150	150		150	150			750
Telegraphers	300	105	40	60	40	60	40	60	40	60		805
Telephone Electricians	160	20	800	1285	1535	1435	1435	1535	1435	850	500	10990
Telephone Linemen			170	160	170	200	170	200	170	150		1390
Telephone Repairmen	15		150		150		150		150			615
Topographical Computers			30		30		30		30			120
Tractor Operators	890	20	690	140	690	140	690	140	690	40		4130
Truck Drivers	350	60	4600	1870	3775	1870	3575	1670	3575	1160		22505
Truckmasters		150		900		900		900		900		3750
Welders, Gas	91		105	25	105	25	105	25	105	25	20	631
Wheelwrights	20	20	55	120	55	120	55	120	55	100		720
TOTAL	14316	93813	36792	25518	43252	26098	42862	25698	42922	19667	1380	287888

This table is a summary of the production sheets for the winter program. It shows the number of trained men that would be available each month. The details for each trade will be found in the large production books which accompany the seven full reports of the committee.

FORM
EST. 1



WAR DEPARTMENT
COMMITTEE ON EDUCATION AND SPECIAL TRAINING

REGULAR DAILY SCHEDULE

INSTITUTION

LOCATION

DATE OF THIS REPORT

This report to be made by EDUCATIONAL INSTITUTION not later than 10 DAYS after arrival of each new group of men
1. Copy sent to Educational Director at Washington
2. Copy sent to District Educational Director
3. Copy retained by Institution
Note—Not more than one course to be reported on one page

DATE MEN REPORTED FOR TRAINING

DATE TRAINING TO BE COMPLETED

COURSE

NO MEN ASSIGNED

PAGE NO

NO OF PAGES

	1	2	3	4	5	6	7	8	9	10
	TIME OF DAY		ASSIGNMENTS			TIME OF DAY		ASSIGNMENTS		
	A M		SHOP CLASS DRILL, ETC	NUMBER OF MEN	NUMBER OF INSTRUCTORS	P M		SHOP CLASS, DRILL, ETC	NUMBER OF MEN	NUMBER OF INSTRUCTORS
	FROM	TO				FROM	TO			
1										
2										
3										
4										
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REMARKS

SIGNATURE

TITLE

FORM
EST. 3

WAR DEPARTMENT
COMMITTEE ON EDUCATION AND SPECIAL TRAINING

INSTITUTION

LOCATION

DATE OF THIS REPORT

EFFECTIVENESS OF INSTRUCTION

This report to be made by DISTRICT EDUCATIONAL DIRECTOR immediately following each periodic inspection
1 Copy to be sent to Educational Director—Washington
2. Copy to be retained by District Director
NOTE.—Not more than one Course to be reported on one page

COURSE
NO. MEN ASSIGNED
PAGE No
No. OF PAGES

1	2
WORK 1—Work should be assigned systematically 2—Practical work should be done, exercises avoided 3—Fundamental principles should be brought out. 4—Work should develop resourcefulness initiative and broad view of trade as well as specialized skill. 5—Equipment should be adequate to give each man continuous work.	CLASS 1—Should be correlated with work 2—Problems and discussions of work rather than lectures. 3—Amount and schedule flexible to meet needs.

KEEPING IN MIND SUCH POINTS AS ABOVE AND THE SPIRIT OF INSTRUCTION MANUAL No 1, MAKE COMMENTS BELOW

PART MOST EFFECTIVE AND WHY	PART LEAST EFFECTIVE AND WHY

SIGNATURE

FORM
EST. 2

WAR DEPARTMENT
COMMITTEE ON EDUCATION AND SPECIAL TRAINING

QUALIFICATIONS OF INSTRUCTORS

INSTITUTION

LOCATION

DATE OF THIS REPORT

THIS REPORT TO BE MADE BY DISTRICT EDUCATIONAL DIRECTOR IMMEDIATELY FOLLOWING FIRST INSPECTION OF EACH INSTITUTION
1. COPY TO BE SENT TO EDUCATIONAL DIRECTOR—WASHINGTON
2 COPY TO BE RETAINED BY DISTRICT EDUCATIONAL DIRECTOR
NOTE—INSTRUCTORS OF DOUBTFUL ABILITY SHOULD BE DISCUSSED WITH LOCAL EDUCATIONAL SUPERVISOR AT EACH REGULAR MONTHLY VISIT. IMPROVEMENTS, CHANGES AND ADDITIONS REPORTED ON THIS FORM AFTER EACH VISIT. INSTRUCTORS OF EACH COURSE REPORTED ON SEPARATE PAGES. SUPERVISORS AND SCHOOL OFFICERS REPORTED ON SEPARATE PAGE. INDICATE INSTRUCTOR IN CHARGE OF COURSE BY (X) IN LEFT HAND MARGIN.

COURSE

PAGE NO.

NO. OF PAGES

	1	2	3	4	5	6	7
	NAMES OF INSTRUCTORS (ALPHABETICAL)	SUBJECT NOW TEACHING OR OFFICE NOW HOLDING	YEARS EXPERIENCE TEACHING THIS TRADE	YEARS PRACT. EXPER. IN THIS TRADE	M—MEMBER OF REGULAR FACULTY E—EMPLOYED NEW FOR THIS WORK	STATUS C—CIVILIAN S—SOLDIER F—FURLOUGHED CIVILIAN	GENERAL COMMENT BEARING IN MIND THE FOLLOWING 1. ABILITY TO GIVE INSTRUCTION 2 INTEREST IN THE WORK 3. ATTITUDE OF THE MEN TOWARD INSTRUCTOR 4. EXPERIENCE AND ABILITY IN JUDGING AND EMPLOYING MEN 5 ATTITUDE TOWARD THE WHOLE PROJECT
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

REMARKS

SIGNATURE

TITLE

Comm. Education & Special Training

TO BE RETAINED BY SOLDIER

1 WAR DEPARTMENT—ARMY TRAINING SCHOOL CERTIFICATE

(SCHOOL) (LOCATION)

NAME ______ PRINT CLEARLY—LAST NAME FIRST NAME MIDDLE NAME

PERMANENT ADDRESS ______ NO STREET CITY STATE

COURSE ______ STARTED—DATE—FINISHED

Trade Rating in School Course

A-Apprentice J-Journeyman E-Expert

Trade Sub-Division	Symbol	Rating
Main		A J E
2nd Best		A J E
3rd Best		A J E

General Ratings by Three or More Instructors

	5-Highest	4-High	3-Middle	2-Low	1-Lowest
Mechanical Ability					
Speed					
Resourcefulness					
Personal Qualities					
Instructor Initials					

Physical Rating ______ Signature ______ Supervisor

Remarks (Military)

Signature ______ Commanding Officer

Form Est. 7

Comm. Education & Special Training

TO BE RETAINED BY SCHOOL

2 WAR DEPARTMENT—ARMY TRAINING SCHOOL CERTIFICATE

(SCHOOL) (LOCATION)

NAME ______ PRINT CLEARLY—LAST NAME FIRST NAME MIDDLE NAME

PERMANENT ADDRESS ______ NO. STREET CITY STATE

COURSE ______ STARTED—DATE—FINISHED

Trade Rating in School Course

A-Apprentice J-Journeyman E-Expert

Trade Sub-Division	Symbol	Rating
Main		A J E
2nd Best		A J E
3rd Best		A J E

General Ratings by Three or More Instructors

	5-Highest	4-High	3-Middle	2-Low	1-Lowest
Mechanical Ability					
Speed					
Resourcefulness					
Personal Qualities					
Instructor Initials					

Physical Rating ______ Signature ______ Supervisor

Remarks (Military)

Signature ______ Commanding Officer

Form Est. 7

MILITARY RATING

This soldier has had 15½ hours weekly of military training, including close order drill, interior guard duty and ceremonies, during a period of .... weeks from ...., 19......, to ...., 19......

He was a ....

(State Grade: Private, Acting Corporal, Etc.)

He is recommended for ....

(State Private or N. C. O. Grade)

Remarks: ....

....

Signature ....

Rank ....

Commanding

[OVER]

FORM
EST. 14

WAR DEPARTMENT

COMMITTEE ON EDUCATION AND SPECIAL TRAINING

INSTITUTION ____________________

LOCATION ____________________

DATE OF THIS REPORT ____________________

RELATION OF QUALIFICATIONS OF MEN TO COURSES OFFERED

THIS REPORT TO BE MADE BY EDUCATIONAL INSTITUTION NOT LATER THAN TEN DAYS AFTER ARRIVAL OF EACH NEW GROUP OF MEN

THE INFORMATION SHOULD AGREE WITH QUALIFICATION RECORD CCP 1

1. COPY TO BE SENT TO EDUCATIONAL DIRECTOR AT WASHINGTON
2. COPY TO BE SENT TO DISTRICT EDUCATIONAL DIRECTOR
3. COPY RETAINED BY INSTITUTION

ANALYSIS OF NUMBER OF MEN EXPERT IN OTHER OCCUPATIONS (LINE 14 COL 2) TO BE MADE ON FORM EST-18 "SUMMARY OF EXPERTS

DATE REPORTED FOR TRAINING ____________

DATE TRAINING TO BE COMPLETED ____________

	CLASSIFICATION ACCORDING TO PREVIOUS EXPERIENCE IN OCCUPATIONS FOR WHICH TRAINING COURSES ARE GIVEN				CLASSIFICATION ACCORDING TO HIGHEST PREVIOUS EDUCATION FOR EXAMPLE H S GRADUATES COL. 7 SHOULD NOT BE INCLUDED IN ELEMENTARY GRADUATES COL. 6					REMARKS
	1	2	3	4	5	6	7	8	9	10
		NUMBER OF MEN			NUMBER OF MEN					
	COURSES	EXPERT	SEMI-SKILLED	TOTAL COL. 2 3	NOT COMPLETED ELEMENTARY SCHOOL	ELEMENTARY SCHOOL GRADUATES	HIGH SCHOOL GRADUATES	COLLEGE GRADUATES	TOTAL COLS 5 6 7 8	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13	TOTALS									
14	ALL OTHER OCCUPATIONS									
15	NOT SKILLED IN ANY OCCUPATION (COL 4 ONLY)									
16	GRAND TOTAL			*					*	

*GRAND TOTAL OF COL 4 CHECKS WITH THAT OF COL 9

SIGNATURE ____________________ TITLE ____________________

FORM
EST 6

WAR DEPARTMENT

COMMITTEE ON EDUCATION AND SPECIAL TRAINING

INSTITUTION ____________________

LOCATION ____________________

DATE OF THIS REPORT ____________________

SUMMARY OF SCHOOL RATING

This report to be made by COMMANDING OFFICER not later than TEN DAYS before end of training period.

1. Copy sent to Educational Director—Washington.
2. Copy sent to District Educational Director
3. Copy retained by Commanding Officer

Summary of this report to be made by TELEGRAPH FIFTEEN DAYS before end of training period (See instructions on back of this sheet.)

DATE REPORTED FOR TRAINING ____________

DATE TRAINING TO BE COMPLETED ____________

	1	2	3	4	5	6	7	8	9
	A. G. O. Classification		Number of Men (Not Names)						
	COURSES	Symbol	Trade Rating			Total of Col. 3, 4, 5	Other	Total of Col. 6, 7	REMARKS
			A	J	E				
	Men to Be Transferred as Qualified in Courses Pursued								
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11	TOTALS								
12	Men to Be Transferred as Unclassified (Indicate in Col. 6)								
13	Experts For Whom Transfer Orders Have Already Been Received (Indicate in Col. 6)								
	Men Not Available For Transfer								Reason For Retaining
14									
15									
16									
17									
18									
19	TOTAL								
20	Grand Totals (Col. 8—Total in Attendance)								

EDUCATIONAL SUPERVISOR ____________________ COMMANDING OFFICER ____________________

FORM
EST. 4

WAR DEPARTMENT

COMMITTEE ON EDUCATION AND SPECIAL TRAINING

INSTITUTION ____________________

LOCATION ____________________

DATE OF THIS REPORT ____________________

MEN UNSUITED FOR TRAINING

This report to be made by EDUCATIONAL INSTITUTION by TELEGRAPH not later than 4 DAYS after arrival of each new group of men. Give data for each of the seven columns separated by commas as shown below. Mail report at same time.

1 Copy sent to Educational Director at Washington
2 Copy sent to District Educational Director
3 Copy retained by Institution

Example of telegram: Report Est. 4 contingent arriving July first comma 450 comma 440 comma 9 comma 2 comma none comma 7 comma 7

DATE REPORTED FOR TRAINING __________

DATE TRAINING TO BE COMPLETED __________

TOTAL NUMBER OF MEN

1	2	3	4	5	6	7
Specified in contract	Reported for training		Totally unsuited for any training given and recommended for immediate transfer out		Total reduction (Cols. 3, 4 and 5)	Can be added by local induction
		Rejected for physical defects	Lack of mental capacity	Unable to speak or understand English		

REMARKS

SIGNATURE ____________________

TITLE ____________________

FORM
EST. 16

WAR DEPARTMENT

COMMITTEE ON EDUCATION AND SPECIAL TRAINING

INSTITUTION ____________________

LOCATION ____________________

DATE OF THIS REPORT ____________________

ANALYSIS OF EXPERTS IN OCCUPATIONS FOR WHICH NO TRAINING IS GIVEN

This Report to be made by EDUCATIONAL INSTITUTION not later than TEN DAYS after arrival of each new group of men. The information should agree with qualification record card CCP-1.

1. Copy to be sent to Educational Director at Washington
2. Copy to be sent to District Educational Director
3. Copy to be retained by Institution

List ONLY number of men EXPERT in occupations for which NO COURSES are being given at your institution.
Total of this Report checks with line 14 in Col. 2 of Report on Form Est. 14.

DATE REPORTED FOR TRAINING __________

DATE TRAINING TO BE COMPLETED __________

Symbol	OCCUPATION	Number Men
37	Accountant	
24	Auto Mechanic	
40	Baker and Cook	
45	Barber	
7	Blacksmith	
26	Bricklayer	
41	Butcher	
8	Carpenter	
22	Chauffeur—auto	
23	Chauffeur—truck	
38	Clerical Worker	
9	Concrete Worker	
50	Construction Foreman	
29	Draftsman	
10	Electrician	
17	Engineman and Fireman	
28	Farrier, Veterinary	
20	Foundryman	
25	Gasoline enginemen (not auto)	
11	Gunsmith	
27	Horse—care of	
49	Inspector	
47	Leather Worker	
32	Lineman	
35	Lumberman	
6	Machinist	
36	Mariner and Boatman	
43	Medical Men	
42	Merchant	
12	Miner	
44	Musician—Band	

Symbol	OCCUPATION	Number Men
13	Painter	
34	Photographer—still & moving	
14	Pipe Fitter	
46	Printer	
15	R R Operating Men	
16	Road Worker	
19	Sheet Metal Worker	
39	Stenographer, Typist	
18	Stockkeeper	
21	Struct'l Steel & Iron Worker	
30	Surveyor	
48	Tailor	
31	Telegrapher—line wireless	
33	Telephone Opr. & Rep'rman	
	OCCUPATIONS Supplementary List	
61	Airplane Mechanic	
64	Architect	
62	Artist (camouflage)	
74	Bacteriologist	
65	Balloonist	
71	Banker and Broker	
63	Boiler Maker	
73	Brush Maker	
76	Canvas Worker	
67	Chemist	
105	Civil Engineer	
77	Compressed Air Operator	
80	Cooper	
70	Crane Operator (Hoistman)	
82	Detective, Policeman	

Symbol	OCCUPATION	Number Men
83	Dog Trainer	
85	Employment Manager	
86	Engraver, Stencil and Die	
68	Fire Dept. Man	
69	Gas Plant Worker	
93	Heating & Ventilating Engr	
87	Hydraulic Engine Operator	
72	Instrum't Maker & Repairer	
75	Laundryman	
89	Mathematician	
78	Metal Finisher	
79	Millwright	
90	Mule Packer	
91	Munitions Worker	
97	Physicist	
66	Pigeon Fancier	
81	Plasterer	
99	Psychologist	
84	Purchasing Agent	
98	Refrigeration Operator	
100	Rigger & Cordage Worker	
94	Rubber Worker	
88	Sanitarian	
101	Stevedore	
102	Transportation Men	
92	Undertaker	
103	Upholsterer and Trimmer	
95	Water Supply Man	
96	Welder	
104	Writer	
	TOTAL EXPERTS	

SIGNATURE

TITLE

NOTE—SEE INSTRUCTIONS ON BACK OF THIS SHEET

FORM EST-8

WAR DEPARTMENT

COMM. EDUCATION & SPECIAL TRAINING

NOTE 1—SCHOOL DELIVER ONE COPY TO COM. OFFICER 14 DAYS BEFORE COMPLETION OF TRAINING PERIOD

2—SCHOOL RETAIN ONE COPY FOR RECORD

SCHOOL RATING REPORT

TO LOCAL COMMANDING OFFICER

FOR MEN FINISHING TRAINING

ON (Date)..

SCHOOL...

LOCATION...

DIRECTOR... Signature

NO. OF SHEETS...

SHEET NO. ....

DATE. ....

No. Consecutively	NAMES REPORT MUST COVER ALL MEN ASSIGNED TO DETACHMENT (List Alphabetically)	OCCUPATION AND RATING (A—APPRENTICE J—JOURNEYMAN E—EXPERT)					Physical Rating	REMARKS	TRANSFER RECORD			
		MAIN OCCUPATION (Consult Trade Index—C. C. P.—504)	Symbol	A	J	E		SICK, RETAINED AS INSTRUCTOR, FAILURES, REJECTIONS, ETC.	REQUISITION No. & DATE	DATE OF TRANSF'R	ARMY ORGANIZATION	DESTINATION
	LAST FIRST MIDDLE	INFORMATION ON CERTIFICATES HELD BY MEN TO AGREE WITH THIS REPORT							TO BE FURNISHED BY COMMANDING OFFICER FOR SCHOOL'S PERMANENT RECORD			

Stenographers and clerks came from cities as far as the Middle West. In appreciation of the splendid work which they were doing in spite of inconvenient and uncomfortable living conditions, a club house was established for them in September at 1028 16th St. N. W., four blocks from the White House. Thirty girls have been accommodated continuously since the opening. A rate of forty dollars per month for room and board and club privileges was fixed. The initial financing required some fourteen hundred dollars which, by the way, was provided through a Pittsburgh, Pa., man. The club has been a great success in every way and will continue as long as there is need. It is entirely self-supporting and complete records of costs are available to any one interested.

COST DATA FOR INSTRUCTION OF COURSES GIVEN UNDER DIRECTION OF THE WAR DEPARTMENT COMMITTEE ON EDUCATION AND SPECIAL TRAINING

(Note: The cost figures in this table are in cents per man per day and are to be used as guides. Slight variations in cost may be necessary because of local conditions. In cases where it is impossible to find well-qualified soldiers for assistant instructors, one civilian instructor should be employed in place of every two soldier instructors indicated in this table. In such cases a greater amount per man per day should be allowed for pure instruction. Soldiers selected for assistant instructors must have a superior personality, technical knowledge and ability to teach.)

	UNIT OF 20 MEN			UNIT OF 100 MEN			UNIT OF 200 MEN			UNIT OF 300 MEN			UNIT OF 500 MEN			Cost in Cents of Materials and Supplies	Cost in Cents of Equipment
	No. of Instructors		Cost Cents	No. of Instructors		Cost Cents	No. of Instructors		Cost Cents	No. of Instructors		Cost Cents	No. of Instructors		Cost Cents		
Name of Course	*c	*s		c	s		c	s		c	c		c	s			
Auto Driving and Repair	1	2	33	5	4	26	8	8	24	12	12	23	20	20	22	25	8
Auto Mechanics	1	2	33	5	5	26	8	10	25	12	14	24	20	25	24	15	12
Blacksmiths	1	1	29	4	4	21	8	8	20							30	5
Carpentry	1	1	33	5	4	27	8	8	20							20	2
Car Repair	1	1	33	5	4	27	8	8	20							10	2
Concrete workers	1	2	35	5	8	27	8	16	24							20	5
Electricians	1½	1	45	6	4	33	10	10	28							20	5
General Mechanics	1	2	29	5	4	27	9	6	21							12	5
Gunsmiths	1	2	33	6	5	32	10	10	26							20	5
Horseshoeing	1	1	29	4	4	25	8	8	21							20	10
Highway Construction	1	2	35	5	10	27	8	16	24							5	2
Instrument Repair	1	2	33	6	4	32	10	10	25							10	10
Lens Grinding	1	2	40	6	4	35										20	10
Locomotive Engineer	1	2	35	5	4	27	9	8	25							2	2
Locomotive Repair	1	2	33	6	4	32	10	8	26							10	2
Machinists	1	2	33	6	4	32	10	8	26							25	10
Mine Drill Runners	1	2	35	6	6	30	10	10	25							15	5
Rubber Workers	1	2	40	6	4	35										20	5
Radio Electricians				7	0	40	13	0	38	18	0	35				8	8
Radio Operation	1	2	30	4	4	20	6	8	16	8	18	15				2	2
Sheet Metal	1	2	35	6	4	32	10	8	26							25	3
Surveying	1	1	35	5	4	28	8	8	22							4	5
Telegraphy	1	2	30	4	4	20	6	8	16	8	18	15				2	2
Telephone Electricians				7	0	40	13	0	38	18	0	35				10	10
Topographical Draftsmen	1	0	35	5	0	30	10	0	26							5	10
Tractor Operators	1	2	33	5	4	25	8	10	20	12	13	18				25	10
Welders (oxy-acet.)	1	2	40	7	6	35										30	20
Wheelwright	1	2	33	5	4	26	8	10	21							20	5

*c means civilian instructors.
*s means soldier assistant instructors.

APPROXIMATE COSTS OF SUPERVISION FOR CONTINGENTS OF VARIOUS SIZES

(The figures given below are intended to include all administration costs distributed between housing, subsistence and instruction.)

Number of men in contingent	200	300	500	1,000	1,500	2,500
Supervision cost in cents per man per day	6.25	5.0	4.7	4.0	3.5	2.9

August 10, 1918

COSTS

The contracts between the Committee on Education and Special Training and the Educational Institutions at which training detachments were conducted were based on the cost per man per day. Very few of the institutions had definite information on costs that enabled them to intelligently compute a rate of charge. Costs were calculated by the representatives of the committee together with the representatives of the institutions and the tentative figures arrived at served as the contract price for the first contingent. In most instances the initial contract rates very closely represented the actual cost. Any variations that were found at the expiration of the first period were adjusted in subsequent contracts.

The cost of operation varied between the different training detachments. There were many factors which influenced this variation. In large cities the cost of subsistence was higher than at State Institutions where farms were operated as a part of the agricultural department. The housing of the men in large cities was also more difficult and costly than at places where ample dormitory facilities were available.

The nature of the course had an influence on the cost of operation. The cost of equipment, material and instructors' salaries were higher for some courses than for others. Certain economies were gained in the larger units which were not possible in the smaller ones.

The following will give an idea of the variation in the items which enter into the cost figures:

A. INSTRUCTION

1. Teachers' salaries, 15c to 35c; average 25c per man per day.
2. Supervision including clerical help, average 5c per man per day.
3. New equipment, 2c to 15c; average (based on yearly contract) 5c per man per day.
4. Consumable supplies, 2c to 30c; average 15c per man per day.
5. Rental on instructional space 0 to 2c; average less than 1c per man per day.
6. Average cost of instruction 52c.

B. HOUSING

1. Teachers' salaries, 15c to 35c; average 25c per man per day. man, average $80 per man, or about 27c per man per day.
2. Rental for housing space estimated at about ½ per cent per month, which meant as an average about 5c per man per day.
3. Cost of heat varied from 2c to 6c per man per day. 4½c is a fair average for the majority of the States.

4. Cost of water, 1c average.
5. Cost of light, 1½c average.
6. Insurance, ½c or less.
7. Average cost of housing 34½c for new construction and 12½c when present buildings were used.

C. SUBSISTENCE

1. Variation for food and service from 50c to 85c, average, 70c.

D. ADMINISTRATION AND OVERHEAD

1. Variation from 0 to 10c average, 2c.

E. TOTAL COST

1. Average $1.36 without new construction to $1.58 with new construction.

The following statement shows the items entering into the cost of giving vocational instruction for a unit of 200 men, to be trained as Auto Mechanics:

New construction for barracks, mess hall, etc., will cost $60 to $100 per man. If these buildings are used for ten months the cost per man per day will be about 27c. In many cases, however, the institutions were able to use college buildings, or rent buildings, making a much lower cost per man per day. Heat for these buildings will cost from 4c to 5c per man per day, and light will cost about 1½c per man per day. Subsistence will range from 50c to 85c per man per day.

To instruct these 200 men in Auto Mechanics, if civilian instructors only are used, will require: one head instructor, salary about $250; two instructors at $200; five at $150; and five at $125; making a total per month of $2,000, which makes 33 1-3c per man per day. If, however, some soldier instructors are used, as was done in many cases later in the summer, the cost will be reduced to about 25c.

The equipment required for these 200 men will cost about $7,500, which will make the per man per day cost 12½c. The administration and overhead costs vary from 1c to 10c the average units finding that 2c will cover this item.

The total cost would therefore be about $1.58 including all new construction and allowing no salvage value for the lumber, automobile teaching material, etc. The salvage value of buildings and equipment, together with lower charges for housing, made it possible to bring the average cost in the committee schools down to $1.40. This average would be raised to $1.45, if the large motor transport units which used no civilian instructors, and therefore had an average cost per man per day of about 91c, were left out of consideration.

PART IV

SPECIAL SUPERVISION

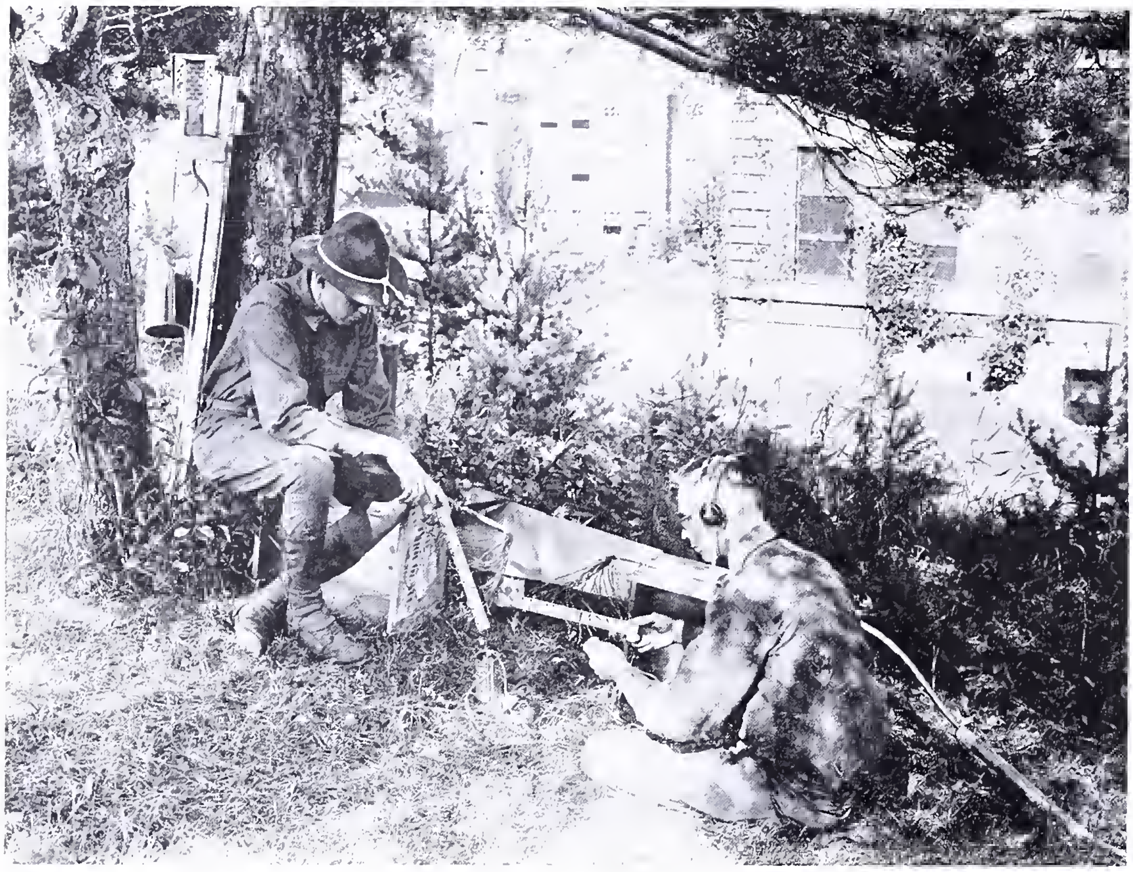
BAND MUSICIANS TRAINING

During the spring a shortage of bandsmen overseas was reported and as the importance of music as one of the elements of morale came to be appreciated, a study of the subject was undertaken by the Army War College with the result that the Committee on Education and Special Training was requested to train and supply from 5,000 to 10,000 bandsmen before June 30, 1919. By September the total monthly requirements for bandsmen had reached 4,200, of which the committee undertook to train 1,500 a month under a two-months' course.

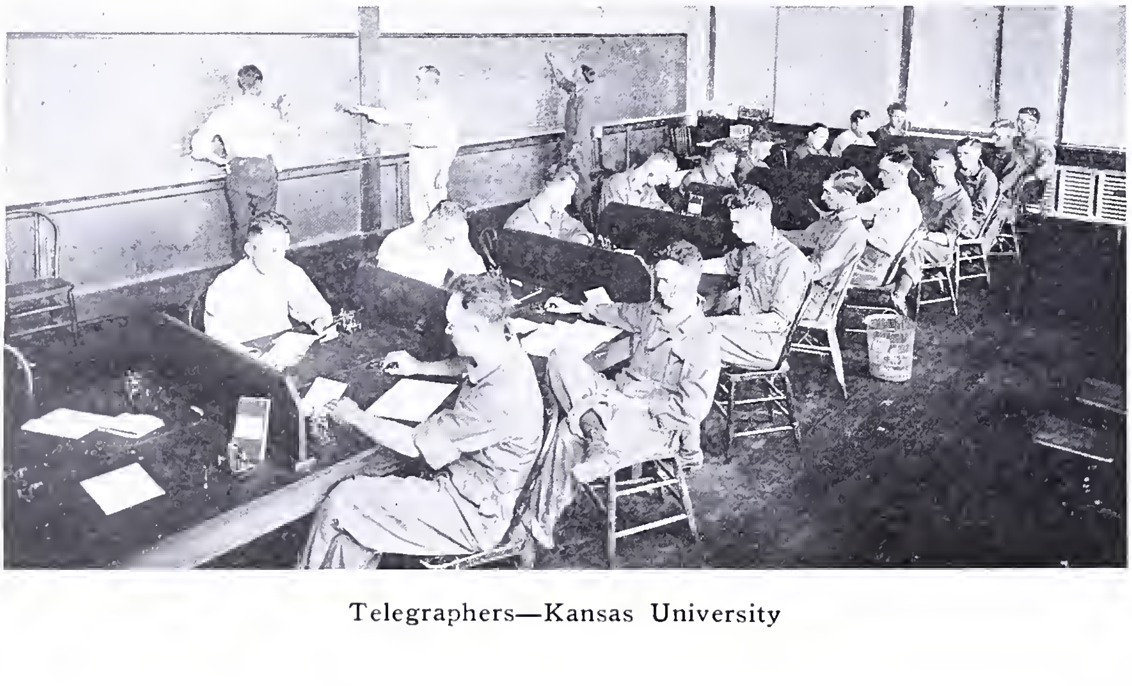
Dr. Wallace Goodrich, of the New England Conservatory of Music, Boston, was appointed supervisor of band musicians training on October 15, 1918. Prior to that date the schools had been canvassed and reported upon by district educational directors with respect to their facilities and capacity for this work, and one contract had been made for a training detachment at Carnegie Institute of Technology, Pittsburgh, Pa., commencing early in September. Dr. Goodrich was assisted by Mr. Timothy M. Spelman, of New York, and Mr. Frederick S. Converse, of Westwood, Mass., and thirteen schools were tentatively selected for training detachments, out of about thirty which had offered their services, but owing to the interruption caused by the influenza epidemic, and afterwards by the signing of the armistice, actual training was never commenced and all plans were abandoned.

The work at Carnegie Institute of Technology, brief as it was, showed that army bandsmen can be successfully trained in civilian schools, which are often able to provide more suitable accommodations for individual practice than can be obtained at an army post.

The general plan for raising the standard of army bands and band music, of which the training program of the Committee on Education and Special Training was only a part, contemplated the enlargement of the existing army band school at Fort Jay with a view to the training of band leaders, and the designation of certain replacement camps in which the final organization of the bandsmen from the schools and the leaders from Fort Jay would be effected. Men would have been obtained from special sources rather than through the draft in the usual way, as it was believed that neither the questionnaire filled out by draftmen nor the information ordinarily possessed by draft boards could be depended upon in the selection of prospective bandsmen.



Cable splicing, telephone electrician's course at Dartmouth College



Telegraphers—Kansas University

COMMUNICATIONS TRAINING

The constantly increasing demands of the communication service for radio operators, radio electricians, telegraphers, multiplex telegraphers, telephone electricians, linemen, photographers and meteorologists made necessary the appointment of a specialist to devote his entire time and attention to the development of this part of the training program. Early in July, H. V. Bozell, Assistant Professor of Electrical Engineering at Yale University was appointed to the position of Supervisor of Communication Training.

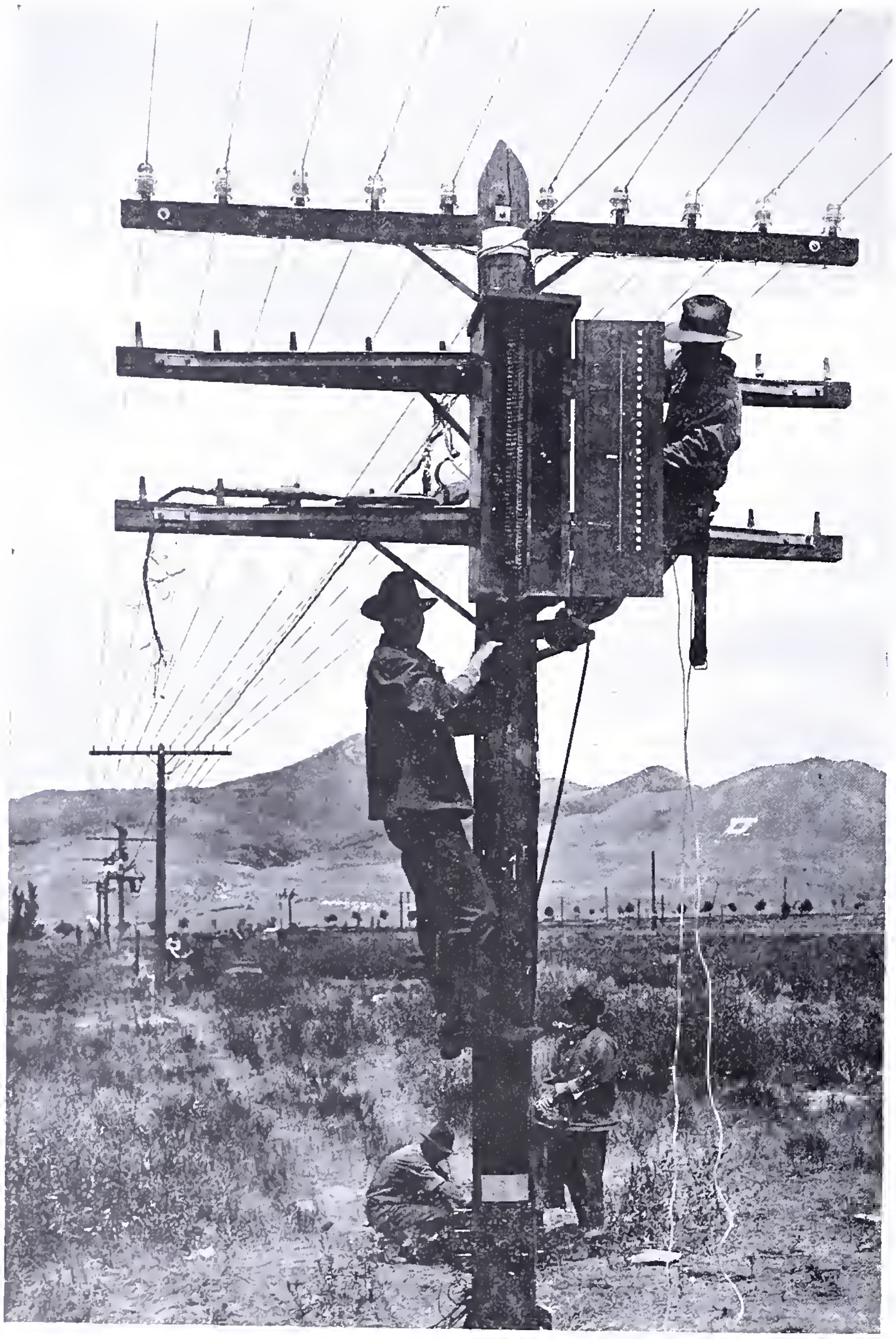
In cooperation with the Field Artillery, Coast Artillery, Engineers, and Signal Corps, careful studies were made of the exact requirements of these corps as to the abilities to be developed in these specialists that would best fit them for the kind of work that they would be called upon to perform in the field service. On the basis of this information training courses were designed and equipment was obtained from the various corps and shipped to the training detachments to be used for instructional purposes.

The Signal Corps had been operating under its own direction schools for training these specialists, at the University of Vermont, College of the City of New York, Texas Agricultural and Mechanical College, Maryland State Agricultural College, and Columbia University. Early in July, at the request of the Signal Corps the Committee took over and operated these schools as a part of its regular program.

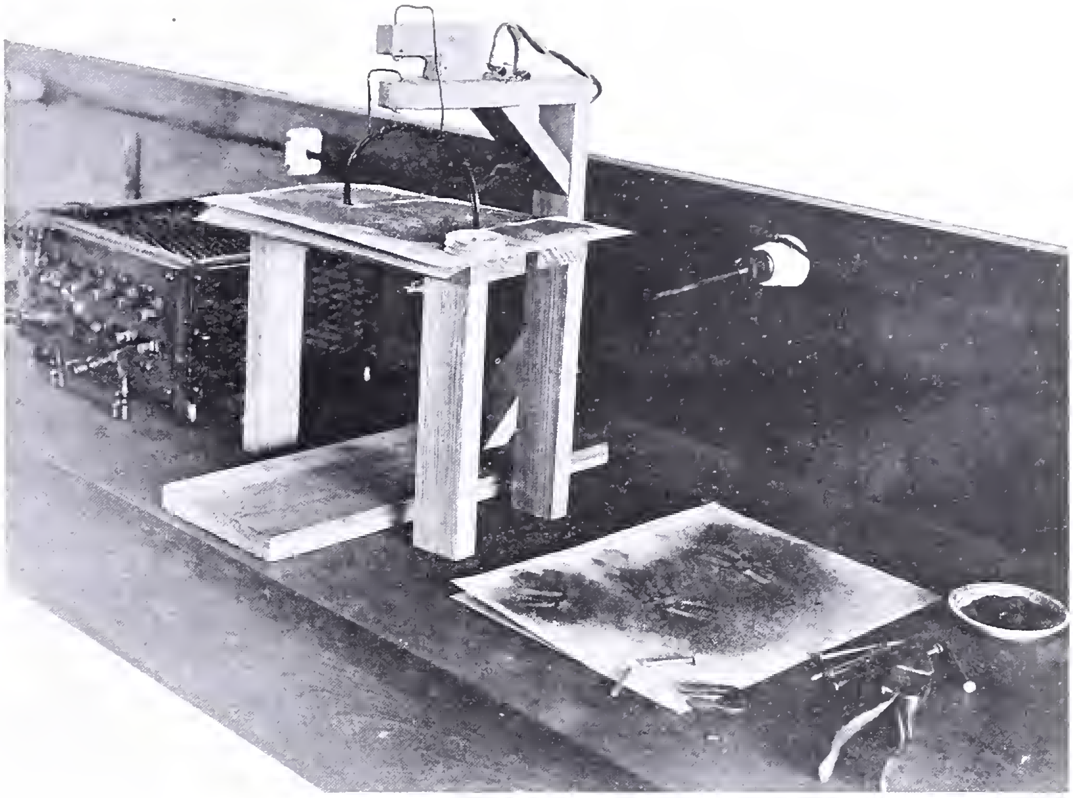
The comparatively large body of technical knowledge and the skill involved in the makeup of a good radio electrician and a good telephone electrician made it necessary to extend the length of training period of the courses for these trades to three months.

One particularly important feature of the communication training was the application of the job method of instruction to a type of training usually, if not always, considered to be necessarily abstract. The results of the application of this system to the training of men in not only manual manipulation of electrical apparatus, but also in a sufficient understanding of its principles to make the men independent and resourceful in the handling of communication apparatus, were satisfactory to a degree beyond expectation. In all of the various institutions over the country having units particularly of these thirteen weeks' courses for radio and telephone electricians, we found a unanimous opinion of the efficiency of placing the man in touch with his subject matter in the laboratory daily and of allowing, so far as possible, laboratory work to give rise to questions of fact and theory which were then or later to be settled by discussion with instructors.

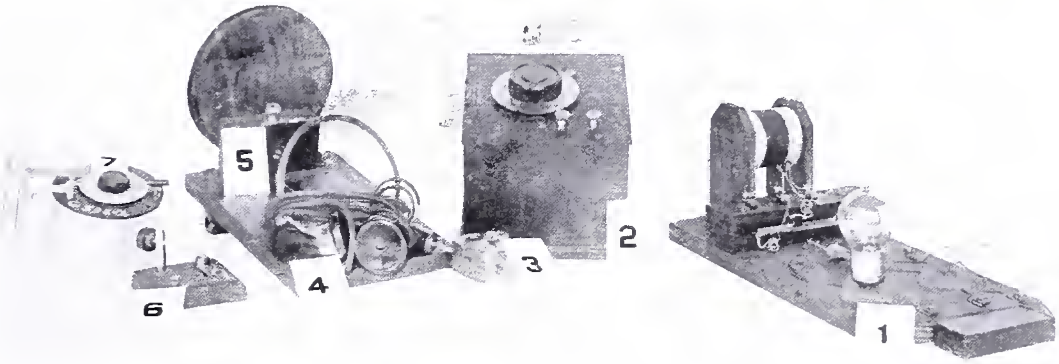
In addition to the job sheet method of teaching, another item to be emphasized is the utilization of extremely simple apparatus to fix fundamental principles—apparatus which placed in the hands of students with job sheets would enable them to work out fundamental electrical principles themselves. This scheme was also carried into the field of radio principles which are very difficult to teach quickly. The accompanying photographs show "home-made" apparatus used at Yale University:



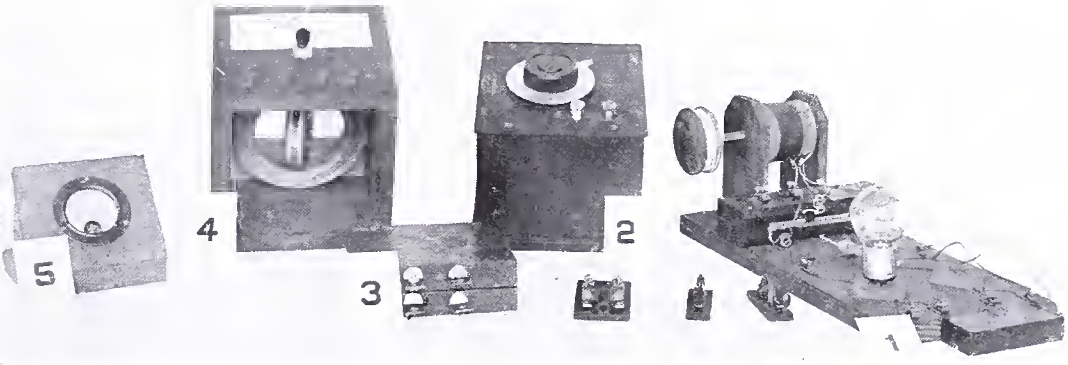
Telephone companies loyally cooperated. The picture shows soldiers of the University of Utah running a commercial line.



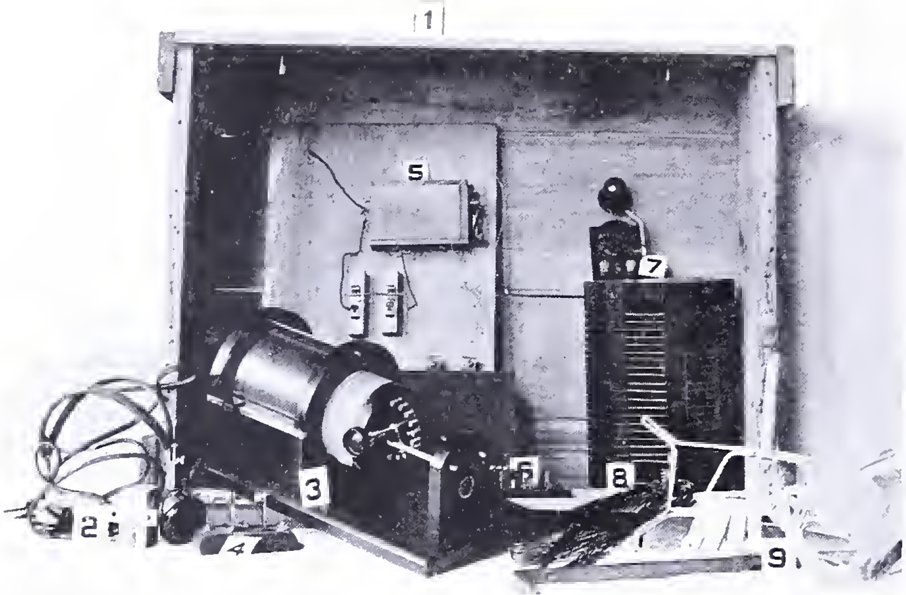
Apparatus to show magnetic forces around a coil



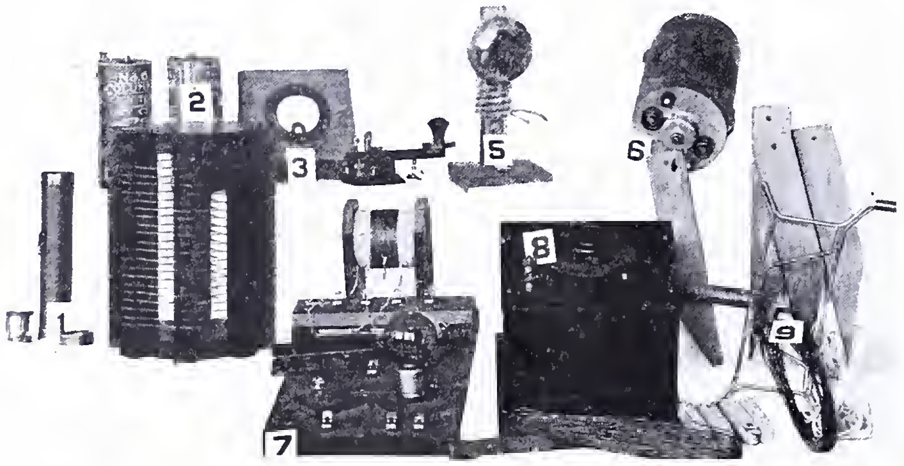
Article No. 4 in this is simplest type of wavemeter, the indicator being a small nine-volt lamp which lights by resonance



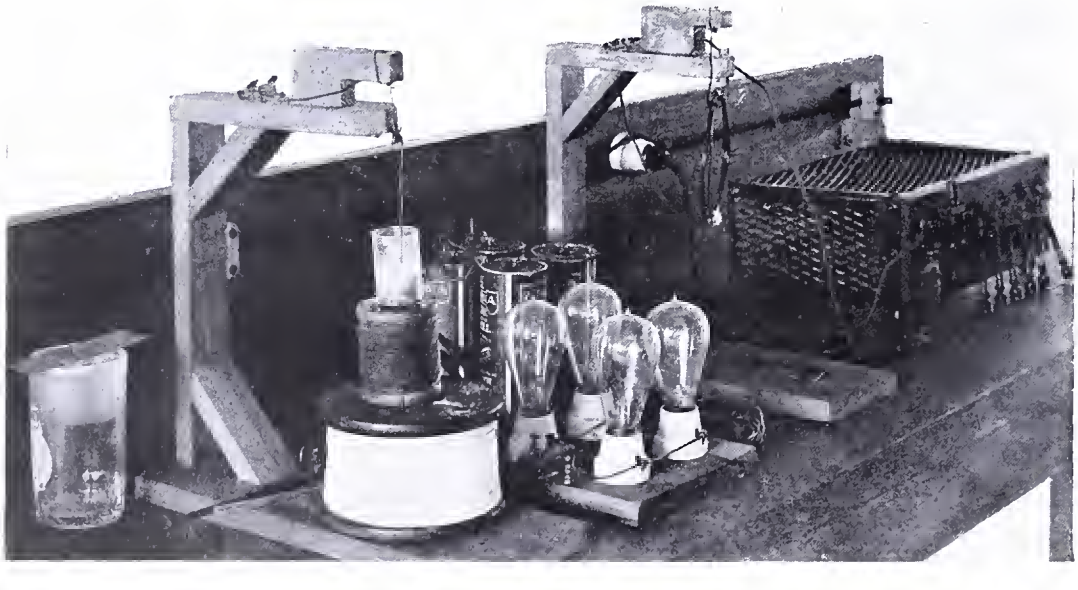
Article No. 1 in this picture is simple power board for oscillating circuit with all elements and connections in plain view. Makeup of condenser is evident to students, as well as arrangements of windings of coil. Article No. 4 is a variable coupling of simplest type.



Group of apparatus making up simplest radio sending and receiving circuits for field practice. Box is used as support of apparatus in field. Article No. 5 is a Ford vibrator used to energize sending circuit. Article No. 7 is type of helix built in laboratory for elementary radio work.



Apparatus used for first field experiments in radio telephony, showing simple elements to be combined into working set by student

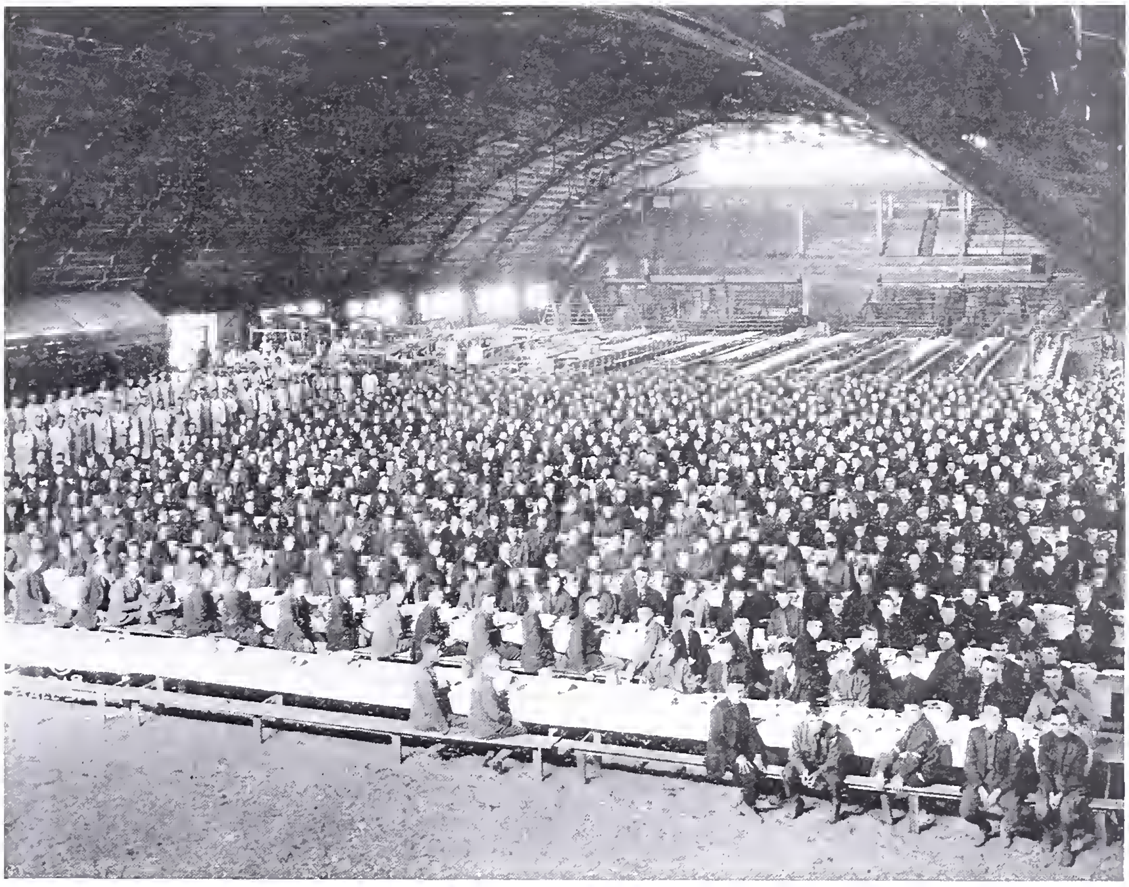


This same coil free to move, used for elementary motor action, and another arrangement with same frame work used to illustrate force on single wire

ARMY COOKS TRAINING

The general shortage of army cooks and the inability of the corps schools to turn them out fast enough, led to a request early in October that the committee train about 1,500 to be used in the various training detachments and in the regular army. Mr. Joseph Byfield, president of the Hotel Sherman Company of Chicago, who had already been of great assistance to the army in supplying trained chefs to various cantonments and training detachments, was engaged to act as supervisor of army cooks training. It was planned to place squads of specially selected men at some 25 of our training detachments, where they would be under the instruction of experienced chefs and have an opportunity for practice in preparing the mess for the soldiers in attendance.

Negotiations were entered into for a monthly production of 390 army cooks; the instruction to begin about December 15. Demobilization took place before the arrangements were carried out.



Oregon State Agricultural College Training Detachment at mess in the armory

The driving course at University of Texas provided a source of constant application of brakes and gear shifting

This photograph shows a number of trucks in supposedly-cross-country formation, driving through rough country. Georgia School of Technology.

MOTOR TRANSPORT TRAINING

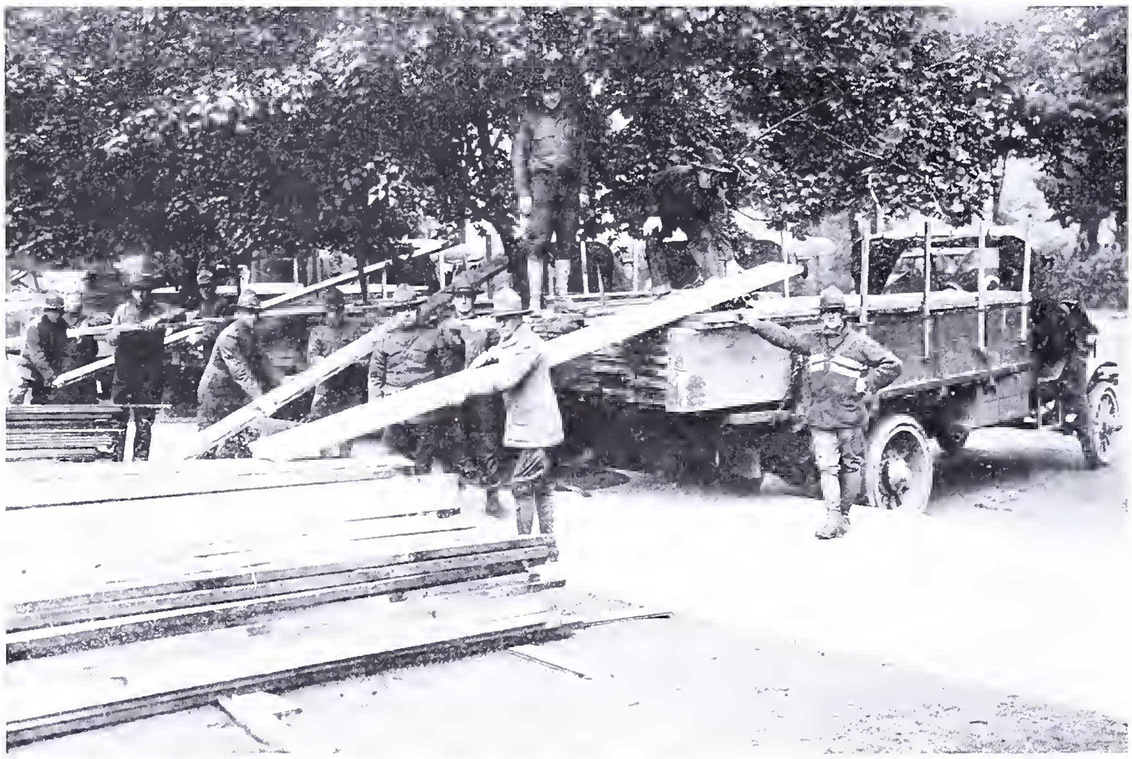
From the beginning of the war it was apparent that auto mechanics, auto drivers and truck drivers would be needed in large numbers, and these courses were among the first established by the committee. By July the work had reached such proportions that a special supervisor, W. S. Field, formerly Personnel Organization Expert, Quartermaster Corps, was appointed to handle all of the motor transport training. With the creation of the motor transport corps within the army organization the program became more definite and was developed in the order of the most pressing requirements of that corps for trained personnel. The training division of the motor transport corps also functioned closely with the committee on Education and Special Training and furnished assistance in the shape of course material, forms, teachers and equipment, although the general shortage of motor vehicles and the extreme need of them overseas interferred seriously with the committee's program.

By the date of demobilization motor training was in progress at 114 educational institutions, and in addition special convoy driving centers of capacity of 1,000 men a month each had been established at Valparaiso University, Valparaiso, Indiana; at Winona Lake, Indiana, under contract with Warsaw Chamber of Commerce; at the Interlaken School for Boys at Rolling Prairie, LaPorte County, Indiana; and at the State Institution for the Deaf at Indianapolis, Indiana, under contract with the Indianapolis Chamber of Commerce. Similar convoy drivers' training centers were to have been opened about December 1, at Springfield, Illinois, South Bend, Indiana, and Columbus, Ohio, and a motorcycle training center was planned and contracted for at Milwaukee, Wis. At Purdue University, Lafayette, Indiana, a truckmaster training center was established with a capacity of 450 men a month, finishing a two-months' course, but the number of men in training did not exceed 380 at any one time. The first detachment was organized August 5, 1918, and the work was continued until demobilization. In addition to lectures and shop practice the training detachments at Purdue were given road work involving transport service for the training center and for firms in the vicinity working under Government contract. Convoy problems in the transport of troops and material were worked out and conducted under conditions simulating those in France. So far as possible the men for this center were specially selected, and on completion of training were recommended for truckmaster, assistant truckmaster, convoy driver or company mechanic.

All of the foregoing training centers were located in the central section of the Middle West because that region presented the most favorable conditions for obtaining motor equipment, good roads, freedom from deep snow, and economical transportation of men and vehicles to the Atlantic Seaboard for movement overseas.

The committee on Education and Special Training delivered to the various army corps 40,625 men trained in motor operation, and would have trained 133,520 more by July 1, 1919, if existing contracts had been fulfilled. The distribution was as follows:

	Training completed	To be Trained
Auto drivers	4,580	7,325
Auto truck drivers (heavy)		33,300
Auto mechanics	25,331	52,610
Chauffeurs		8,280
Company mechanics		1,600
Ignition		170
Motor convoy men	75	
Motorcycle repair men	65	4,640
Motorcyclists	32	3,500
Truck drivers	10,180	18,495
Truckmasters	362	3,600
Total	40,625	133,520



Unloading after an eighty-mile run, University of Michigan Training School

NEGRO TRAINING

In May, June and July colored training detachments were operated at the following twelve negro schools:

Tuskegee Normal and Industrial Institute, Tuskegee, Ala.
Branch Normal College, Pine Bluff, Ark.
Howard University, Washington, D. C.
Agricultural and Mechanical College of Florida, Tallahassee, Fla.
Georgia State Industrial College, Savannah, Ga.
Atlanta University, Atlanta, Ga.
Western University, Quindaro, Kan.
Negro Agricultural and Technical College, Greensboro, N. C.
Wilberforce University, Xenia, Ohio.
State Agricultural and Mechanical College, Orangeburg, S. C.
Prairie View Normal and Industrial College, Prairie View, Texas.
Hampton Normal and Agricultural Institute, Hampton, Va.

Of these the Florida A. and M. College and the Georgia State Industrial College each received but one group; the others had training detachments up to the time of demobilization.

In September when the collegiate units of the Students' Army Training Corps were organized the need arose for a modification of the vocational courses in colored schools with a view to providing commissioned and non-commissioned officers for negro regiments. The modified plan provided that after the regular vocational period of two months had been completed, students who showed capacity for leadership might be held over for two, four or six months (according to age) for further military training and for instruction in academic subjects of military value, such as sanitation and hygiene, mathematics, science and English, preparatory to officer training camp.

Mr. George P. Phenix, vice-principal of Hampton Institute, was engaged September 20 as supervisor negro training to direct and organize the modified courses for colored schools. Two assistants were appointed to make inspections in the field. Mr. W. T. B. Williams, a graduate of Hampton Institute and Harvard University, and Mr. L. A. Roy, a graduate of Hampton Institute. Both are colored men of wide experience in negro education, and their assistance in inspecting and supervising the work of the training detachments until their demobilization was most valuable.

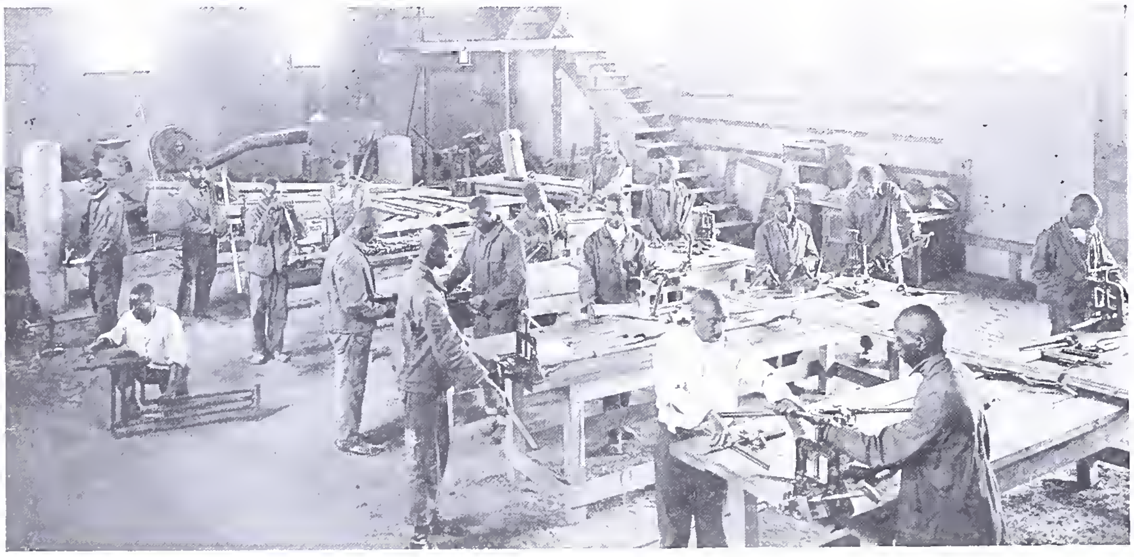
Out of twenty-nine schools inspected, the following were approved from both the military and vocational standpoint for training detachments under the new plan, in addition to those already in operation.

State Agricultural and Mechanical College, Normal, Ala.
Agricultural and Mechanical College of Florida, Tallahassee, Fla.
Georgia State & Industrial College, Savannah, Ga.
Southern University, Baton Rouge, La.

Straight College, New Orleans, La.
Alcorn Agricultural and Mechanical College, Alcorn, Miss.
Lincoln Institute, Jefferson City, Mo.
Shaw University and St. Augustine School (to combine and form one unit), Raleigh, N. C.
Tennessee Agricultural and Industrial State Normal School, Nashville, Tenn.
St. Paul's Normal and Industrial Institute, Lawrenceville, Va.
West Virginia Collegiate Institute, Institute, Va.

In October the schools which had been approved were notified and several were ready to sign contracts when the armistice put an end to the negotiations.

As a result of the year's work, 7,400 negro soldiers were trained at 12 colored schools in 24 occupations.



Pipe fitting, Tuskegee Institute

PART V

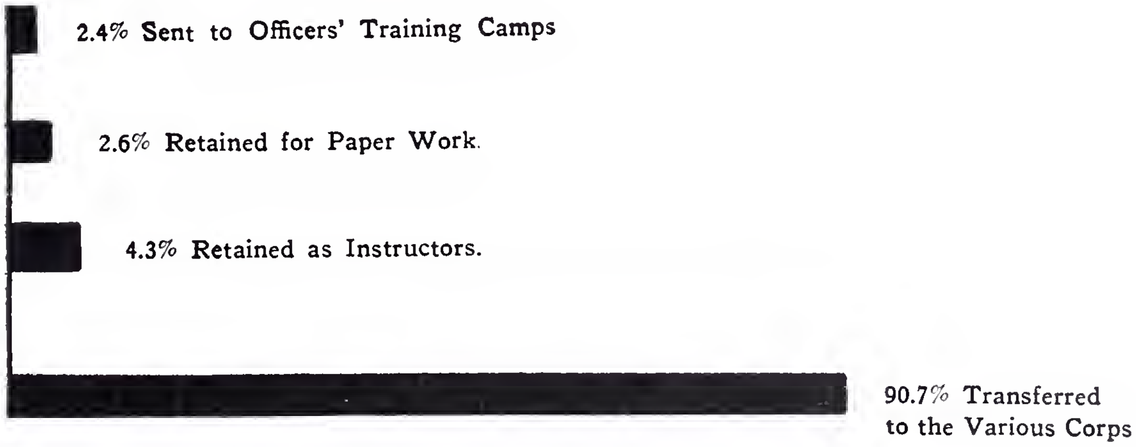
GENERAL SUMMARY

STATISTICS

The training program as a quantity production job is illustrated by the curves and charts on the succeeding pages. The raw material is described on page 96 and in the adjacent text. Any figures which may be given can but substantiate the general fact that the men trained in most of the detachments were a typical group of National Army men with the illiterates eliminated. The men rejected in process of training were so few that complete reliable figures concerning failures are lacking. The best estimates of the waste vary from three-fourths per cent to one and one-half per cent. The distribution of the men trained, computed on the same basis as the charts on page 96, is shown below. The reported distribution to the various corps appears on page 166.

The quality of the product was arrived at through reports received from the line officers to whom the men were assigned. Of necessity this was something in the nature of a continuous sampling process. The report of Lieutenant Helm, see page 175, summarizes a set of replies received in October and reflects the generally favorable impression which the product of the schools made upon the line officers.

The direct cost of the instruction at the schools has already been referred to on page 147. The overhead has not yet been entirely computed. The vocational work proceeded on the confident assumption that the American people would not hesitate to pay the price for education effectively given. No thought of profit either for individuals or for schools was entertained but all attention was focused on doing the educational job well. The results seem to justify the assumption.



Distribution of graduates of Training Schools.

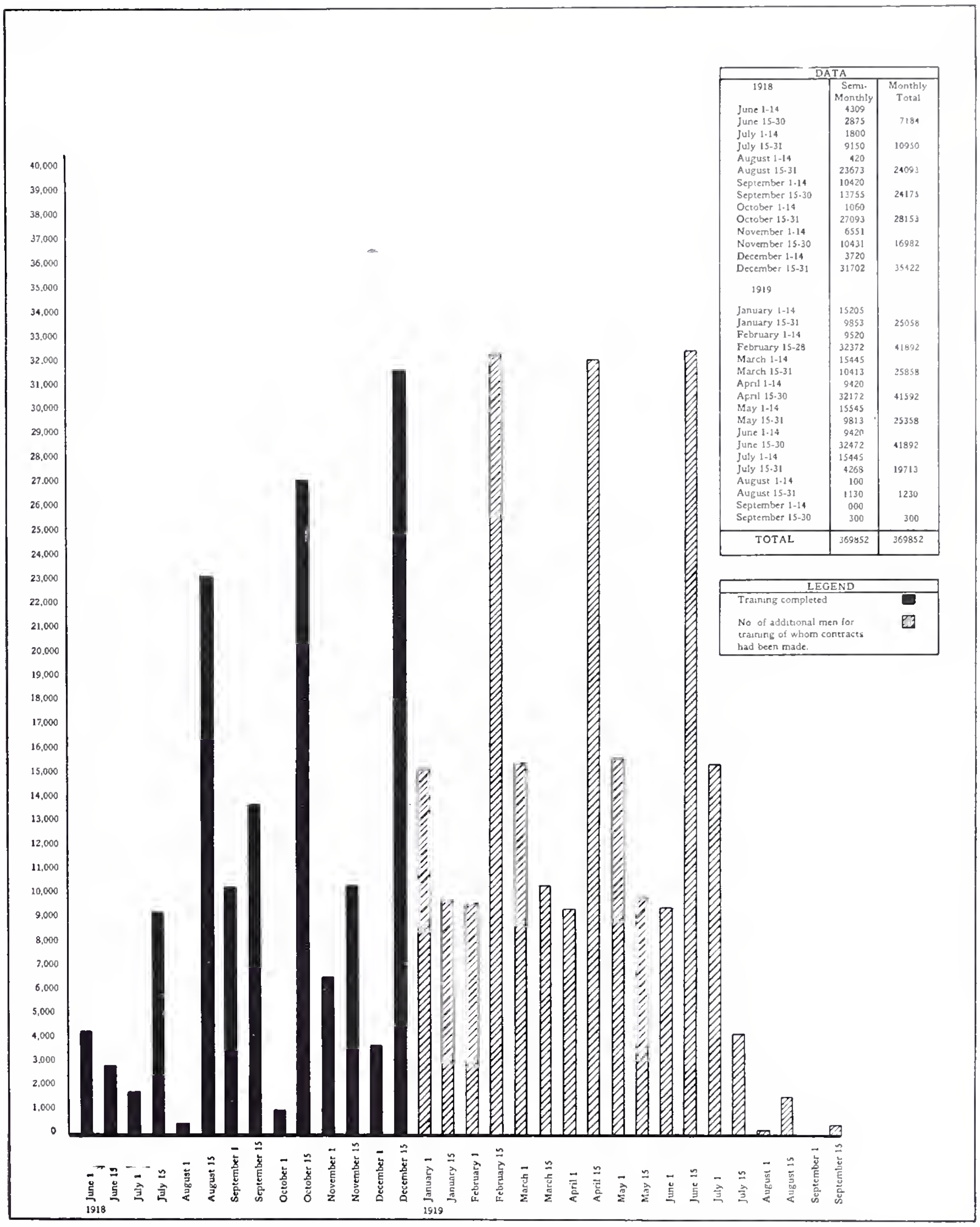
COMMITTEE ON EDUCATION AND SPECIAL TRAINING, VOCATIONAL SECTION—DISTRIBUTION OF MEN FROM VOCATIONAL SCHOOLS TO VARIOUS CORPS UP TO AND INCLUDING NOVEMBER 13, 1918.

VOCATIONS	INF.	F. A.	C. A.	ENG.	Q. M.	ORD.	M. T.	SIGNAL	MIL. A.	MEDICAL	MCH. G.	TANK	C. W. S.	CAV.	TOTAL	COLORED
1. Accountants			2		1				3				1		7	
2. Airplane Engineers									35						35	
3. Airplane Mechanics and Riggers									41						41	
4. Artists, Camouflage	1	1						1							3	
5. Auto Drivers, Chauffeurs	266	1646	359	352	171	54	713	156	150	401	1	310	1		4580*	215
6. Auto and Motor Mechanics	3822	3443	1506	762	1898	1960	5545	283	2450	2106	778	750	28		25331*	368
7. Blacksmiths and Horseshoers	580	387	594	486	799	283	384	23	175	9	304	51		36	4111*	328
8. Boilermakers	3			2											5	
9. Butchers			4	1											5	
10. Carpenters, Cabinet Makers, Woodworkers	2026	1113	1848	2488	1341	1880	172	19	429	139	430		26		11911*	503
11. Chemists	2					3							15		20	
12. Civil Engineers	2			3		2									7	
13. Clerical Workers	16	3	3	9			1					4			36*	14
14. Cobblers	43					5				5	5				58*	58
15. Compressor Operators						1									1	
16. Concrete Foremen, Concrete Workers	84	203	297	598	34	45			3	6	59		40		1369*	34
17. Construction Foremen			2	34											36	
18. Cooks and Caterers	9		26				1	2	1			1			40	
19. Draftsmen		65	7	11					5			1	2		91	
20. Electricians	408	1011	701	722	488	76	129	1155	252	4	218		5		5169*	134
21. Engineers and Firemen (Steam Power Plant)	28			89	2				5				1		125	
22. Farriers and Veterinarians	1								1	3					5*	1
23. Foundrymen	1										1	1			3	
24. Gas Engine Locomotive Men	359	143	216	89	337	39			84	1	63	12			1343	
25. Gas Plant Workers									9				4		13	
26. Gunsmiths	146				2	752			536		93	1			1530*	2
27. Instrument Repairers		115	24			526	1	15	28	20					729	
28. Leather Workers	1	24				18	1			3	3		2		52*	25
29. Lens Grinders						19									19	
30. Lithograph Workers				1											1	
31. Locomotive Engineers and Firemen				300											300	
32. Machinists, Experts	76	188	110	146		471	74		3	3	70	358			1499	
33. Mechanical Engineers				1		1		1							3	
34. Mechanics, Battery		75				51	10			2					138	
35. Mechanics and Machinists, General	316	350	259	136	167	1468	274	10	120	15	168	82	9		3374*	200
36. Millwrights		13					5								18	
37. Miners. (For Motor Convoy)	6	245	4	282		2					32				571	
38. Motorcycle Repairmen. (Men see No. 71)					21		14	30							65	
39. Motorcyclists							1	30				1			32	
40. Munition Workers		21	62			111							1		195	
41. Musicians	1	1		2											4	
42. Painters			2												2	
43. Pharmacists						1									1	
44. Photographers, Wet Plate and Military	1		1	4				2							8	
45. Pipe Fitters and Plumbers	19	32	19	38	178	16	7	10	26		5	6	20		376*	49
46. Printers, Process				5			1								6	
47. Propeller Makers				8					14						22	
48. Radio Electricians			5					347	2						354	
49. Radio Operators	398	627	23	6				1855	536	2	20	57			3524*	118
50. Railroad Operating Men				157	24										181	
51. Range Table Computers						71									71	
52. Rubber Workers		3			93	90	48		83	53		1			371*	3
53. Saddlers			1												1	
54. Sheet Metal Workers	45	111	313	5	495	126	224		162	3		40	3		1527*	19
55. Stenographers and Typists			2				4	25							31	
56. Storekeepers			6			3		5							14	
57. Surveyors and Topographers			3	18				1	1						23	
58. Tailors								4							4	
59. Technical Graduates (High School)				1				2			1				4	
60. Telegraphers	78	285	30	208		3	3	928	1			1			1537*	174
61. Telephone Electricians								71							71	
62. Telephone Linemen		46	12	4				144	19			2			227	
63. Telephone Operators								26							26	
64. Telephone Troublemen		46	4					123	7						180	
65. Tractor Operators	18	175	84			164	4				20	6			471*	83
66. Truck Chauffeurs	2109	2090	1125	581	1242	116	1208	388	192	390	229	508	2		10180*	888
67. Truckmasters	21	14	1		25		214	4	1	53		29			362*	14
68. Unclassified	1927	565	838	1559	155	187	198	48	340	86	139	98			6140*	447
69. Welders, Gas and Electric	10		61	1	90	5	55		20			1	1		244	
70. Wheelwrights	17	11		1		6	18				11				64*	35
71. Motor Convoy Men							75								75	
TOTAL	12840*	13052*	8554	9110*	7563*	8555*	9384*	5708*	5734	3304*	2650*	2321	161	36	88972	3712
Total Colored Men (Included in total above)	983	1627		257	55	176	110	115		111	278					3712

*Indicates colored men already included in total.

SUMMARY

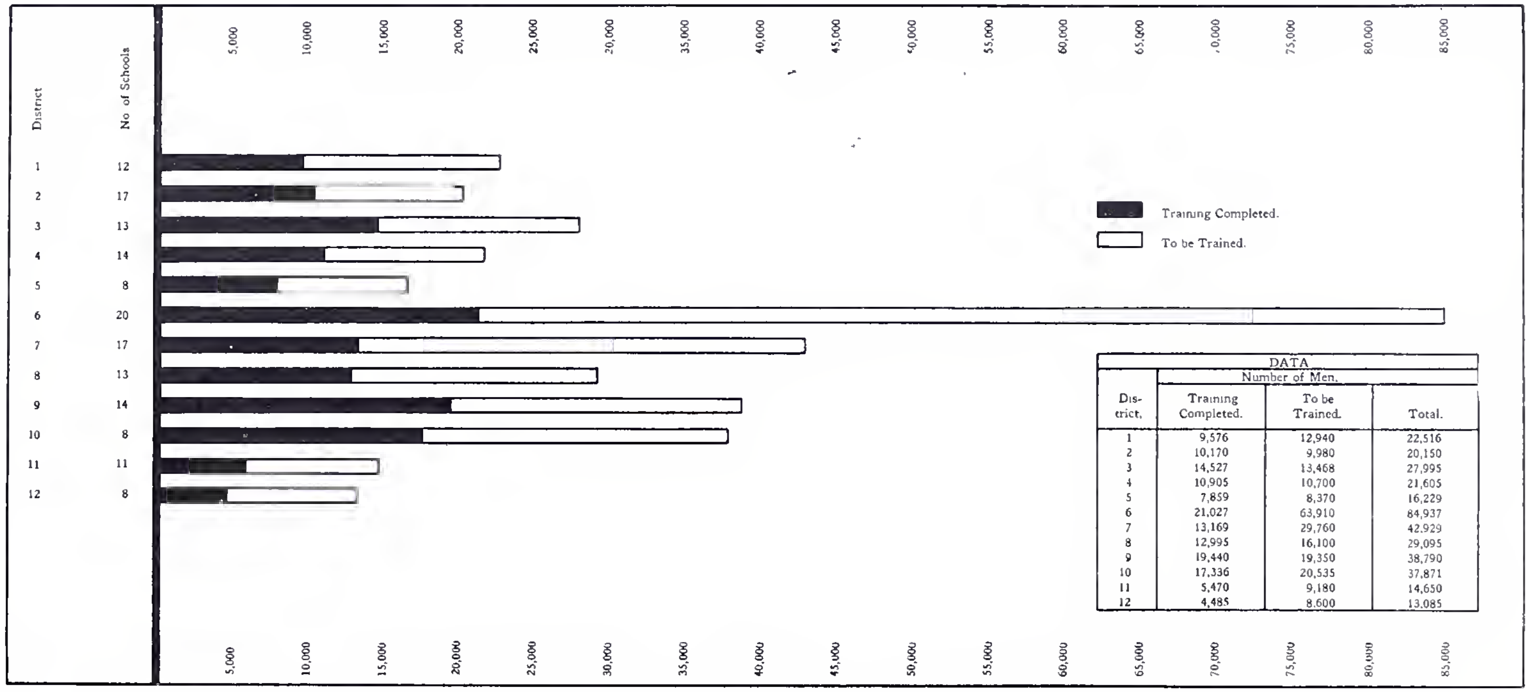
To Central Officers Training Schools	1144	Percentage of colored to total sent to Various corps	0.04172
Total (white) to various corps	85260	Percentage of white to total sent to various corps	0.95828
Total (colored) to various corps	3712		
	90116		1.00000



DATA		
1918	Semi-Monthly	Monthly Total
June 1-14	4309	
June 15-30	2875	7184
July 1-14	1800	
July 15-31	9150	10950
August 1-14	420	
August 15-31	23673	24093
September 1-14	10420	
September 15-30	13755	24175
October 1-14	1060	
October 15-31	27093	28153
November 1-14	6551	
November 15-30	10431	16982
December 1-14	3720	
December 15-31	31702	35422
1919		
January 1-14	15205	
January 15-31	9853	25058
February 1-14	9520	
February 15-28	32372	41892
March 1-14	15445	
March 15-31	10413	25858
April 1-14	9420	
April 15-30	32172	41592
May 1-14	15545	
May 15-31	9813	25358
June 1-14	9420	
June 15-30	32472	41892
July 1-14	15445	
July 15-31	4268	19713
August 1-14	100	
August 15-31	1130	1230
September 1-14	000	
September 15-30	300	300
TOTAL	369852	369852

LEGEND	
Training completed	■
No of additional men for training of whom contracts had been made.	▨

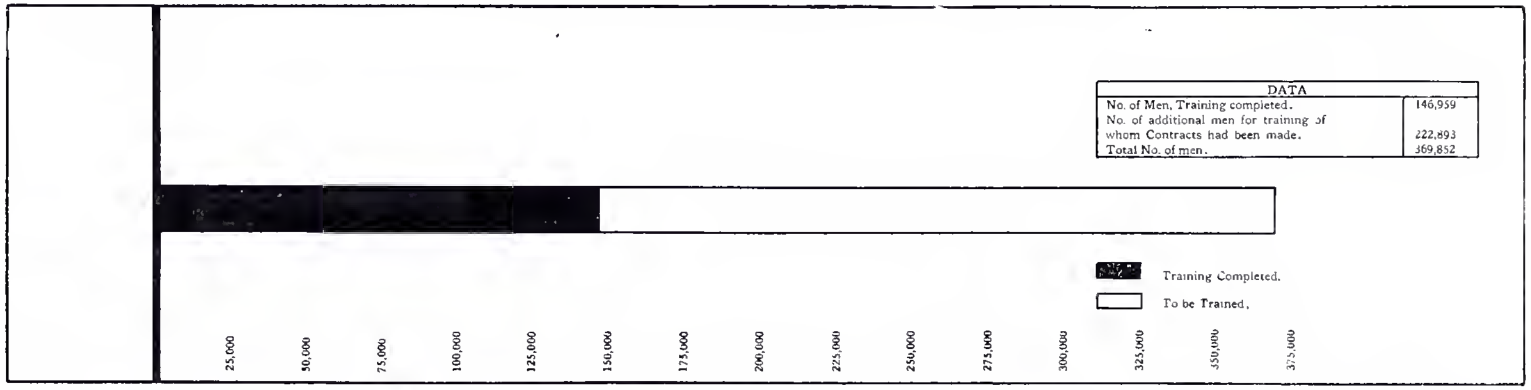
Production—Number of men completing training course in semi-monthly periods. Dates used are dates upon which courses were completed. Based on contract figures from April, 1918, to September, 1919.



DATA

Dis-trict.	Number of Men.		
	Training Completed.	To be Trained.	Total.
1	9,576	12,940	22,516
2	10,170	9,980	20,150
3	14,527	13,468	27,995
4	10,905	10,700	21,605
5	7,859	8,370	16,229
6	21,027	63,910	84,937
7	13,169	29,760	42,929
8	12,995	16,100	29,095
9	19,440	19,350	38,790
10	17,336	20,535	37,871
11	5,470	9,180	14,650
12	4,485	8,600	13,085

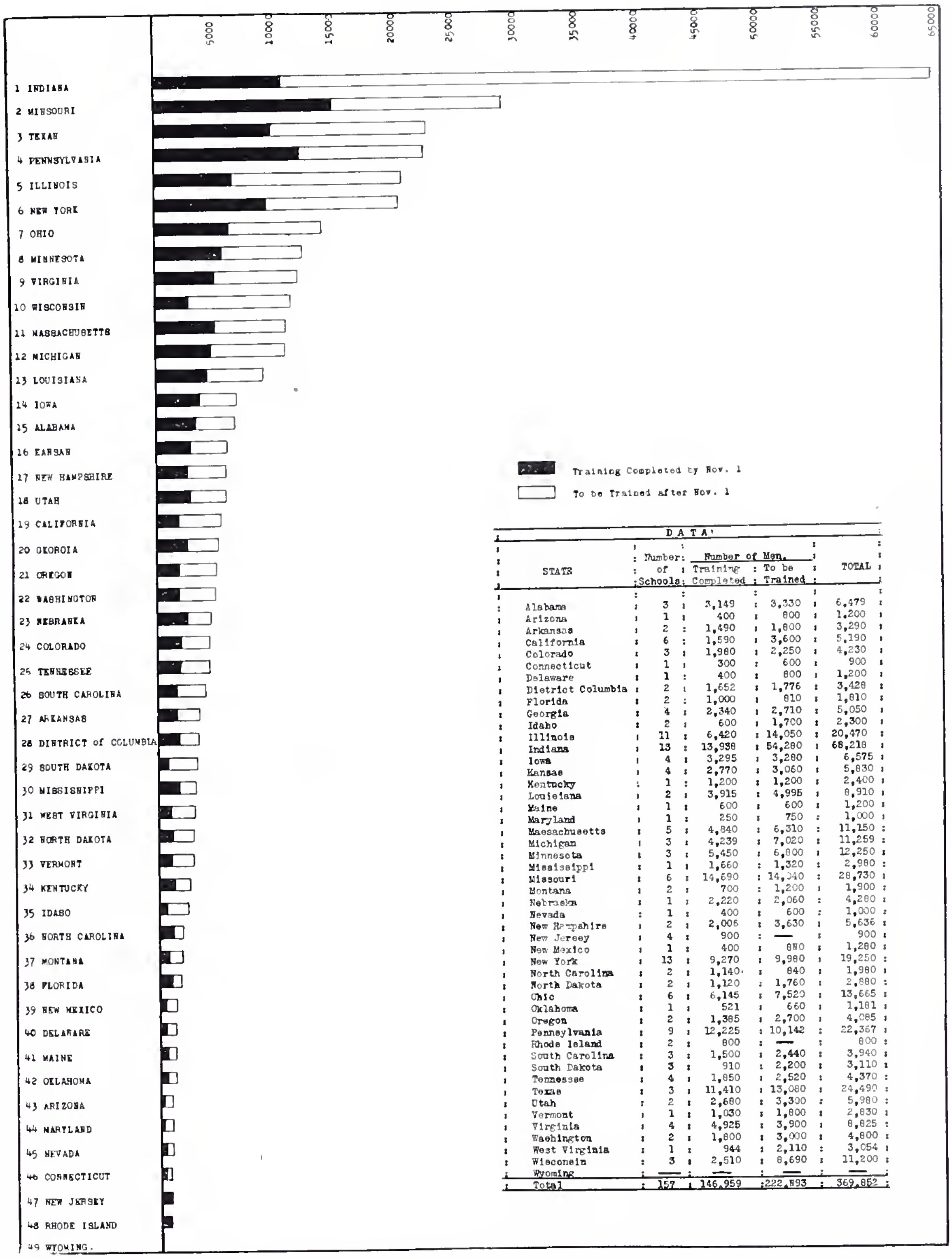
Training program for each district showing portion completed and portion to be trained.
Committee on Education and Special Training.



DATA

No. of Men, Training completed.	146,959
No. of additional men for training of whom Contracts had been made.	222,893
Total No. of men.	369,852

Total training program showing portion completed and portion to be trained.

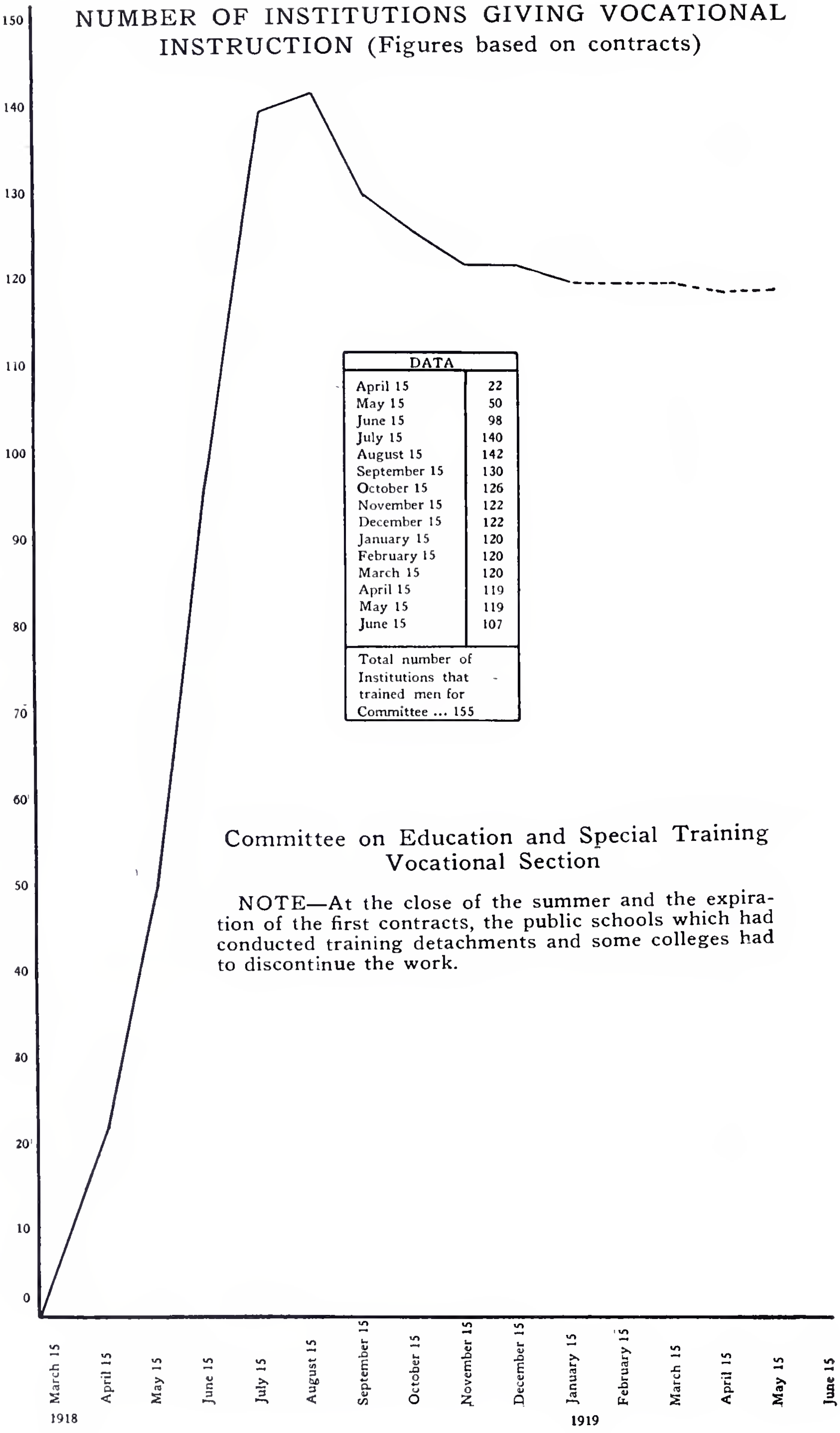


DATA

STATE	Number of Schools	Number of Men. Training Completed	Number of Men. To be Trained	TOTAL
Alabama	3	3,149	3,330	6,479
Arizona	1	400	800	1,200
Arkansas	2	1,490	1,800	3,290
California	6	1,590	3,600	5,190
Colorado	3	1,980	2,250	4,230
Connecticut	1	300	600	900
Delaware	1	400	800	1,200
District Columbia	2	1,652	1,776	3,428
Florida	2	1,000	810	1,810
Georgia	4	2,340	2,710	5,050
Idaho	2	600	1,700	2,300
Illinois	11	6,420	14,050	20,470
Indiana	13	13,938	54,280	68,218
Iowa	4	3,295	3,280	6,575
Kansas	4	2,770	3,060	5,830
Kentucky	1	1,200	1,200	2,400
Louisiana	2	3,915	4,995	8,910
Maine	1	600	600	1,200
Maryland	1	250	750	1,000
Massachusetts	5	4,840	6,310	11,150
Michigan	3	4,239	7,020	11,259
Minnesota	3	5,450	6,800	12,250
Mississippi	1	1,660	1,320	2,980
Missouri	6	14,690	14,040	28,730
Montana	2	700	1,200	1,900
Nebraska	1	2,220	2,060	4,280
Nevada	1	400	600	1,000
New Hampshire	2	2,006	3,630	5,636
New Jersey	4	900	—	900
New Mexico	1	400	880	1,280
New York	13	9,270	9,980	19,250
North Carolina	2	1,140	840	1,980
North Dakota	2	1,120	1,760	2,880
Ohio	6	6,145	7,520	13,665
Oklahoma	1	521	660	1,181
Oregon	2	1,385	2,700	4,085
Pennsylvania	9	12,225	10,142	22,367
Rhode Island	2	800	—	800
South Carolina	3	1,500	2,440	3,940
South Dakota	3	910	2,200	3,110
Tennessee	4	1,850	2,520	4,370
Texas	3	11,410	13,080	24,490
Utah	2	2,680	3,300	5,980
Vermont	1	1,030	1,800	2,830
Virginia	4	4,925	3,900	8,825
Washington	2	1,800	3,000	4,800
West Virginia	1	944	2,110	3,054
Wisconsin	3	2,510	8,690	11,200
Wyoming	—	—	—	—
Total	157	146,959	222,893	369,852

Training program for each state showing portion completed by November, 1, 1918, and and portion under contract to be completed by September, 1919.

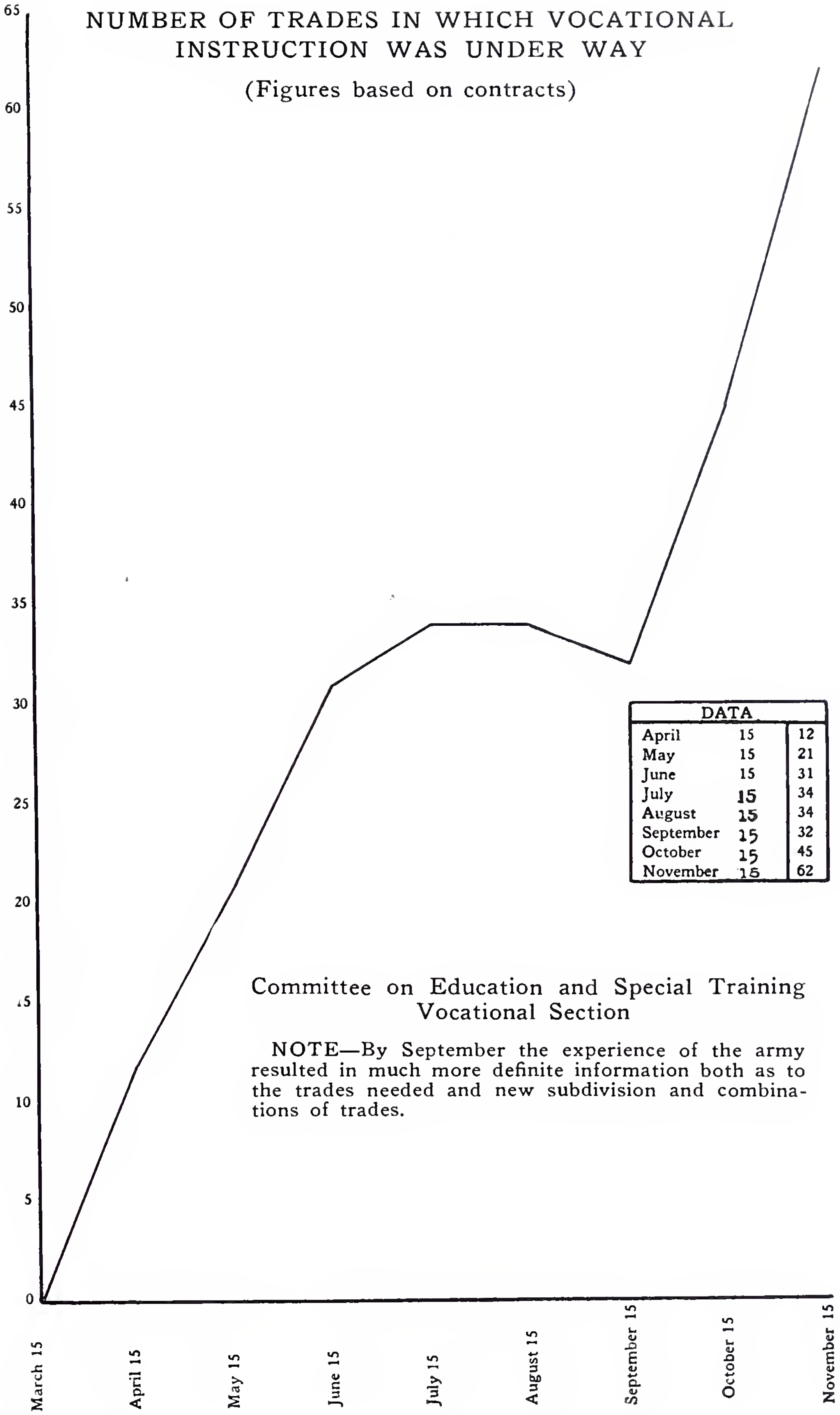
NUMBER OF INSTITUTIONS GIVING VOCATIONAL INSTRUCTION (Figures based on contracts)



DATA	
April 15	22
May 15	50
June 15	98
July 15	140
August 15	142
September 15	130
October 15	126
November 15	122
December 15	122
January 15	120
February 15	120
March 15	120
April 15	119
May 15	119
June 15	107
Total number of Institutions that trained men for Committee ... 155	

Committee on Education and Special Training
Vocational Section

NOTE—At the close of the summer and the expiration of the first contracts, the public schools which had conducted training detachments and some colleges had to discontinue the work.



NUMBER OF TRADES IN WHICH VOCATIONAL INSTRUCTION WAS UNDER WAY

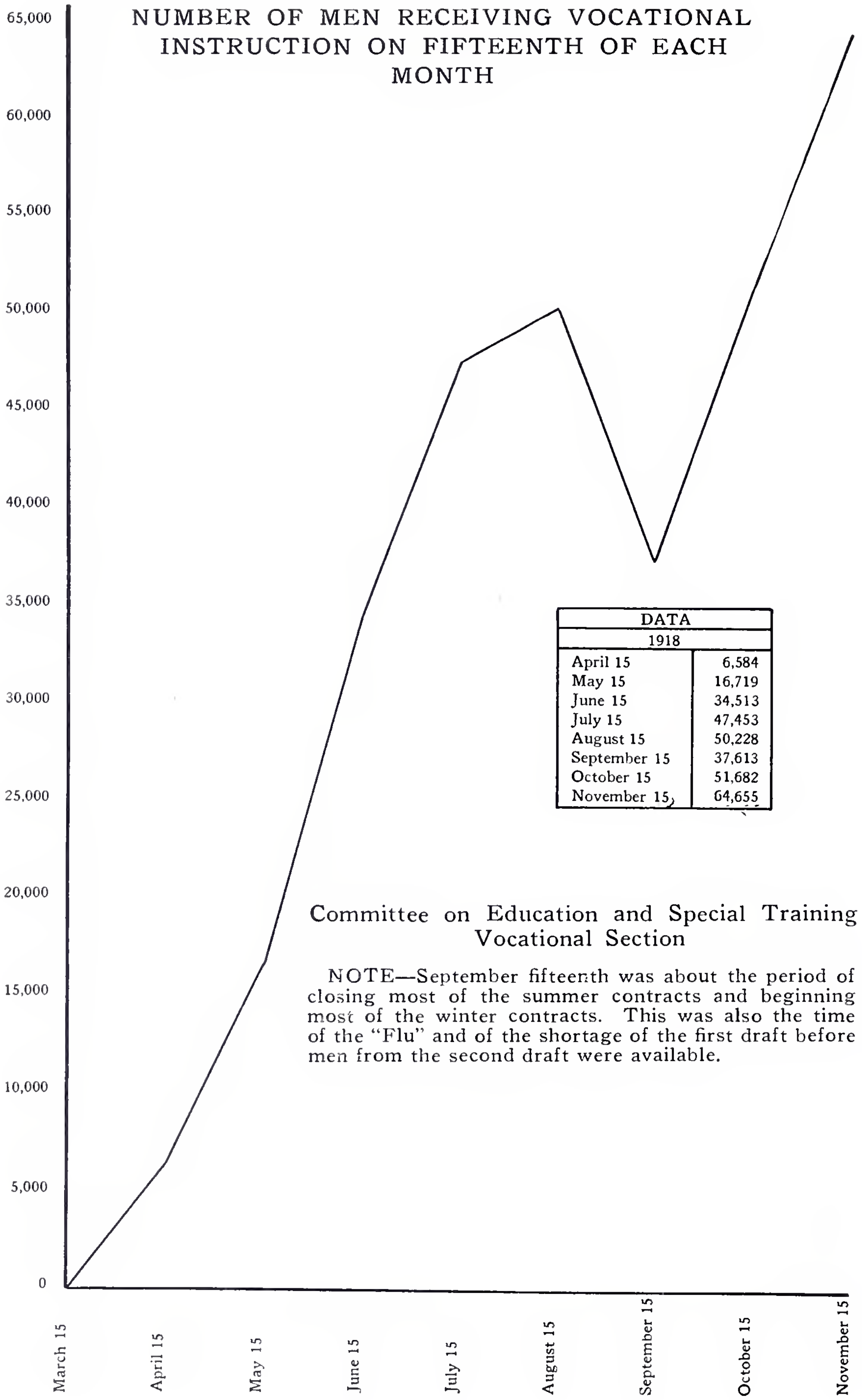
(Figures based on contracts)

DATA		
April	15	12
May	15	21
June	15	31
July	15	34
August	15	34
September	15	32
October	15	45
November	15	62

Committee on Education and Special Training
Vocational Section

NOTE—By September the experience of the army resulted in much more definite information both as to the trades needed and new subdivision and combinations of trades.

NUMBER OF MEN RECEIVING VOCATIONAL INSTRUCTION ON FIFTEENTH OF EACH MONTH



DATA 1918	
April 15	6,584
May 15	16,719
June 15	34,513
July 15	47,453
August 15	50,228
September 15	37,613
October 15	51,682
November 15	64,655

Committee on Education and Special Training
Vocational Section

NOTE—September fifteenth was about the period of closing most of the summer contracts and beginning most of the winter contracts. This was also the time of the "Flu" and of the shortage of the first draft before men from the second draft were available.

MILITARY COMMENT ON MEN TRAINED

FROM: Lieut. Carl Helm, Statistical Officer, Personnel Division, Committee on Education and Special Training.

TO: Major Sherman Peer, Chief Personnel Officer, Committee on Education and Special Training.

SUBJECT: Inspection of reports on graduates of Training Detachments. Reports were received from the commanding officers of the camps to which the graduates were sent.

FIELD ARTILLERY

Of the twenty-four reports examined from Commanders of Field Artillery units, most of whom were battalion and regimental commanders, twenty (20) were excellent reports of a highly complimentary nature. Seven of those were based upon the discipline, drill, and the vocational and practical value of the men, while the remaining thirteen were restricted to their military proficiency alone.

COAST ARTILLERY CORPS

Forty-three reports from Coast Artillery Corps Commanders were received and examined. Twenty-five of these covering discipline, drill and practical value of the vocational training were very complimentary, as were fourteen bearing solely upon discipline and drill.

SIGNAL CORPS

Of a total of thirty-three reports from as many commanding officers in the Signal Corps, twenty-one were excellent reports on both the military and vocational training of the men; four were fair reports; four (4) perfunctory, giving little or no information, and the remaining four were poor reports.

AIR SERVICE

Twelve reports have been received from the Air Service. Ten (10) of these reports were favorable; six covering both the military and vocational work, four being confined to the military training alone.

QUARTERMASTER CORPS

Of thirty-five reports received from as many different commanders of Quartermaster Corps units, thirty-one reports were complimentary, many highly so, both as to the military and the vocational efficiency of the men.

Eleven of these thirty-five reports had reference to the military efficiency of the men alone; nineteen reported on both the military and vocational efficiency of the men; two were so perfunctory as to be useless, while the remaining three were bad reports.

MOTOR TRANSPORT CORPS

Three reports have been received to date from the Motor Transport Corps. All three are very positive in their praise of the men sent, as to discipline, drill and vocational training.

ENGINEER CORPS

Twenty-two reports from Commanders of Engineer Corps units were examined. All but five of these reports were uniformly good, rating the men well above the average in discipline, drill, and practical value to the service.

Four reports, while generally giving excellent ratings on discipline, drill and vocational training complained about the physical quality of the men.

ORDNANCE CORPS

Reports from the Ordnance Corps were confined to trade tests, no reports being made on discipline and drill.

In trade tests of 2,112 men out of a group of 2,683 the following results were obtained, to-wit:

Number of men trade tested		2,112
Results of trade tests:		
Experts	195	
Journeymen	1,147	
Apprentices	676	
Novices	94	
Comparison with School Ratings:		
Men receiving same rating	1,038	
Men receiving higher rating	467	
Men receiving lower rating	264	
Balance not rated at institution	343	2,112
Data in re previous civilian experience:		
Men with previous training in same trade	1,109	
Men with previous training in allied trade	444	1,553

No report on balance.

INFANTRY

Twenty-nine reports from as many commanders of infantry units were examined. Twenty-four reports were highly complimentary, the balance being a little better than "fair." Thirteen of these twenty-nine reports were based upon both the military and the vocational efficiency of the men, the balance, sixteen, being based solely upon the military.

Discipline was generally rated "excellent to good" the average being "very good" whereas drill was generally rated "good to fair."

Reports from all branches of the service give a higher rating to the discipline than to the drilling efficiency of the men. The fundamentals in drill are sometimes being sacrificed in the haste resultant from over anxiety to cover the entire schedule in the two months allowed for it.

MACHINE GUN

The seven reports received from machine-gun units are all very favorable reports both on discipline, drill and vocational training.

One report made by Colonel E. G. Ovenshine deserves especial mention. It is from the Headquarters of the Specialists School M. G. T. C. at Camp

Hancock, Georgia, and is dated September 1, 1918, and states that all of the thirty-seven men received from Mississippi A. & M. and the Ohio Mechanics Institute are acting as instructors in the Machine Gun Mechanics School following their completion of a course in this school.

AMMUNITION AND SANITARY TRAINS

14th Division, Camp Custer, Aug. 31, 1918.

Eight reports from the 14th Ammunition Train, covering 152 men, were all very complimentary both as to discipline, drill and as to the practical value of the men.

Of the eight reports received from the 14th Sanitary Train, covering 68 men, seven reports were complimentary and one but "fair."

IN RE LETTERS FROM SOLDIERS

Investigation of twenty or more letters and wires which were written by soldiers of various detachments from various units complaining that they were not properly assigned with reference to their vocational training, indicate that they were simply the result of too hasty judgment on the part of the soldiers themselves. They were all written in from one to three weeks after original assignment. Units could hardly be expected to have all men placed vocationally within that time. Furthermore, where men are assigned as specialists in accordance with the tables of organization of a particular corps which is at present without the equipment needed to use them as specialists, the men imagine they have been misplaced, e. g. tractor drivers with the Field Artillery.

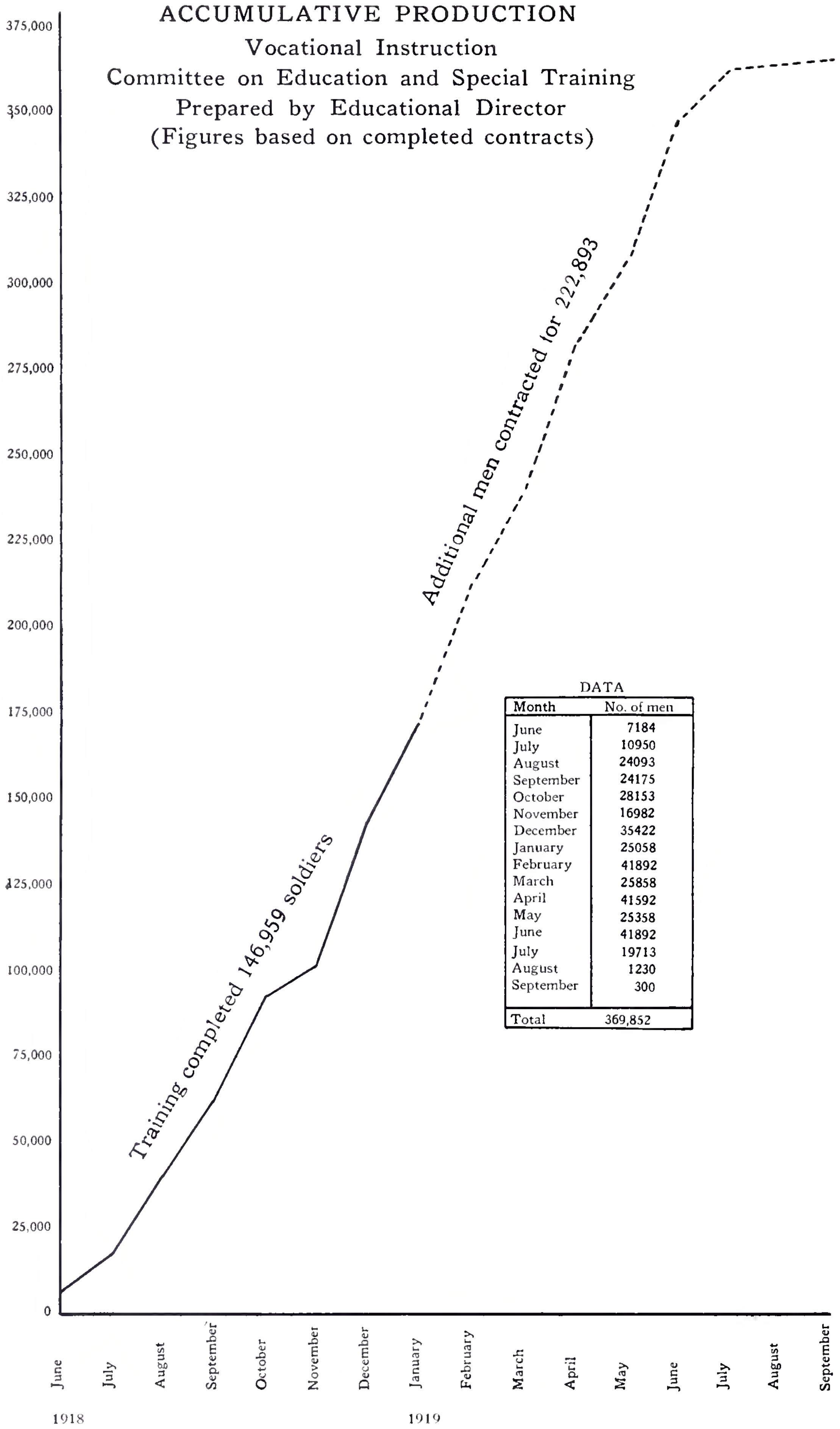
While the reports are not full enough to cover this point thoroughly yet it is felt from what information has come in that the various Corps are using the men in the places they are best adapted and trained for.

Some of the letters written were of a type to indicate very poor discipline and morale upon the part of the particular soldier.

SUMMARY

Out of a total of 228 reports received from as many different commanding officers, but 24 were found to be other than complimentary. 136 reports were based on both the military and vocational training while 62 were based upon the military training alone.

These totals are exclusive of the reports received from the Ordnance Corps. The Ordnance Corps reports are merely Trade Test reports, as given on a preceding page.



ACCUMULATIVE PRODUCTION

Vocational Instruction
Committee on Education and Special Training
Prepared by Educational Director
(Figures based on completed contracts)

DATA

Month	No. of men
June	7184
July	10950
August	24093
September	24175
October	28153
November	16982
December	35422
January	25058
February	41892
March	25858
April	41592
May	25358
June	41892
July	19713
August	1230
September	300
Total	369,852

SUMMARY

In looking backward over the data resulting from this experiment in education, there appear to be three general lines of comment necessary to sum up the whole experience. It is fitting in closing to attempt some words in appreciation of the single-minded devotion of the schools. The significance of the experiment to the Army itself calls for comment. Some reference is needed as to the effect of the experience upon the reconstruction activities of the schools.

The institutions responded with a patriotic spirit and an enthusiasm to serve which were unbounded. With no thought of financial profit and often in advance of complete guarantee that the Government would reimburse them for the necessary expenditures, they arose to the emergency in a manner that will stand for all time as an example of patriotic service. In fact the dominance of the spirit of service released by the war is primarily responsible for the success of the work. These incentives played their part not only in producing the exemplary action of boards of trustees and school executives but also in arousing the wide-spread enthusiasm on the part of the instructors who devoted themselves completely to the service. This impelled the soldier mechanic to turn his thoughts from home life and surroundings and to release his energies for the work in hand.

In addition, the productive work, on which he found himself engaged in the shops, appealed to his creative instincts, and gave him the satisfaction of daily accomplishment. The tasks that came to his hand interested him because they appealed to him as being in themselves worth while.

Besides the soldier spirit and discipline of the detachments, there were several elements of the methods employed which gave character and definiteness to the work and sustained the patriotic and productive motives. These were:—

1. The definiteness of the jobs for which men were being trained. This made possible clear specifications as to the training and as to the attributes of the men to fit each job.
2. The rigid test that had to be met in the Army Corps to which the soldier mechanics were delivered.
3. The method of learning by doing which was enforced by instruction manuals in which the course material was analyzed into a series of jobs.

Resourcefulness, initiative and adaptability are attributes which are broadly ascribed to the American youth and through their exercise in the past America has solved her most pressing national problems. Army training manuals define the purpose of discipline as the development of team work. It is essential to the American conception of team work that each individual should have a maximum freedom in the application of all that he has learned to his particular job in the team. In selecting methods of occupational training every effort was made to conserve and develop in the individual these essential personal attributes.

In facing any future emergency certain experiences of the Committee will be found basic to any effective action. In the very beginning of the vocational work it was found necessary to provide the schools with accurate definitions of the various army jobs and with details concerning the qualifications desired in the men who were to serve as soldier mechanics in the army. The Trade Specifications and Occupational Index, which had been prepared by the Committee on Classification of Personnel, was therefore supplied to each school immediately. Modifications of these specifications were furnished from time to time as further information was gathered mainly through the process of preparing instruction manuals.

The inexperience of many of the educational institutions in the work of intensive vocational education and the very vague conceptions of the qualifications of the various types of army mechanics held by the members of teaching staffs made necessary the compilation and distribution of the instruction manuals. To the teacher they outlined the required information and suggested a method of teaching it. In the hands of the soldier they served as a text or instruction guide.

The trade testing of the graduates of the Training Detachments after they had been assigned to the various corps promised to be an invaluable aid in the improvement of the course. The reports received from the Corps Commanders to whom the graduates were sent directed attention to the weaker training detachments. Plans to give the trade tests at the schools as an aid to a more intelligent certification, were in process of formation when the armistice stopped everything.

Our Army in times of peace will probably not be able to recruit a sufficient number of trained specialists to meet its requirements. More than ever before it will doubtless develop training schools at army posts to supply its own needs. If these schools are co-ordinated with industry in such a manner as to give a well-rounded training in the corresponding civilian trade, soldiers honorably discharged at the end of the term of enlistment would find ready employment in the industries at attractive wages. As soon as the Corps Schools begin to deliver to industry these well-trained, resourceful tradesmen, a satisfactory type of volunteer and a superior peace-time morale in the Army will be relatively easy of attainment.

Among the peace-time duties of the Army Corps Schools the emergency experience suggests the emphasis of the following:

1. To provide a supply of specialists against future emergencies.
2. To collect and organize data and technical knowledge in all the army trades, constant vigilance being exercised to see that all current improvements in practice are fully developed and reduced to such written form as to make them available immediately in case of emergency.
3. To keep current records of all civilian vocational training facilities in the country.
4. To keep informed upon and to develop improved methods of teaching.

Industry has long been in need of skilled workmen, but during the coming period of reconstruction the commercial and industrial advancement of the Nation will demand that men be trained in far greater numbers and to a far greater degree of proficiency. To the schools undertaking to meet this need our war-time experience should suggest as the prime need, a recognition of the motives that should be called forth in the students. Once the driving motives are incited, the rest is easy. Productive work for the purpose of learning by doing has been shown to be a powerful agent for stimulating motives of the right sort. The administrative measures to make the motives effective must also be given full attention by civilian schools and in this connection much may be gained from a study of the manuals issued by this Committee, the Trade Tests of the Committee on Classification of Personnel and the army methods of laying down definite specifications for the job and for the man to fill the job.

One specific example of a cooperative effort upon which industries need to enter with schools will serve. The industries should supply the schools with specifications covering such of their product as enters industries after graduation. These specifications are entirely too vague if given in terms of subjects or knowledge, but must take the form of a definite description of detailed jobs which must be done and problems which must be solved. To build this and similar foundation elements of the structure upon which cooperation in the training of a skilled body of employees must be based, industries should set up long range policies and detail competent personnel permanently to make effective their relations with the schools.